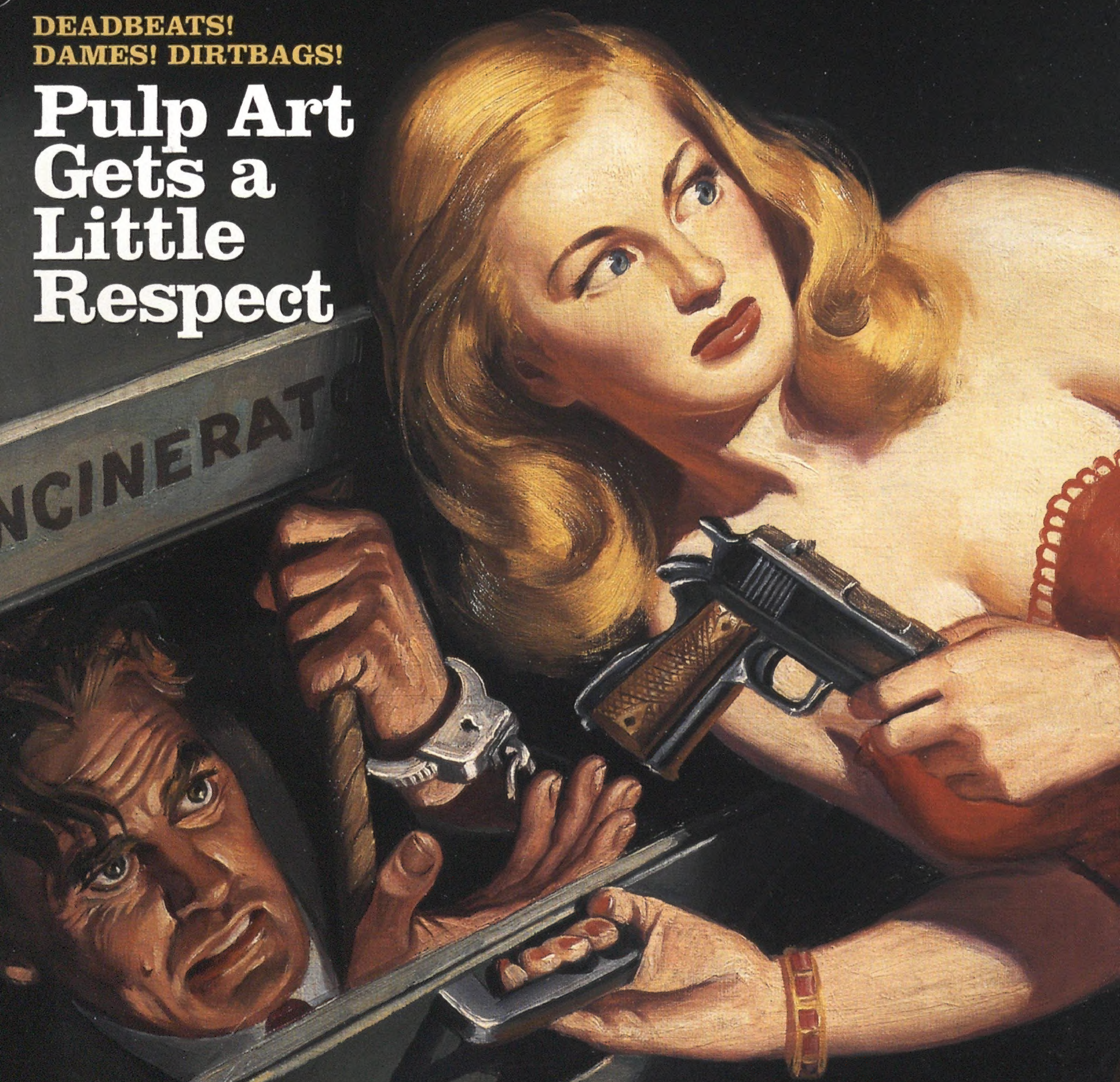
BURNING QUESTION: LET FOREST FIRES BLAZE?

AUGUST 2003

Smithsonian

DEADBEATS!
DAMES! DIRTBAGS!

Pulp Art Gets a Little Respect



Ben Franklin, Revolutionary · BOSTON'S ISLAND GETAWAYS
MESOPOTAMIA'S MASTERPIECES · Rethinking Aggression
America's Queen of Chess · WHY LEWIS AND CLARK MATTER

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CLOUD THE ISSUE

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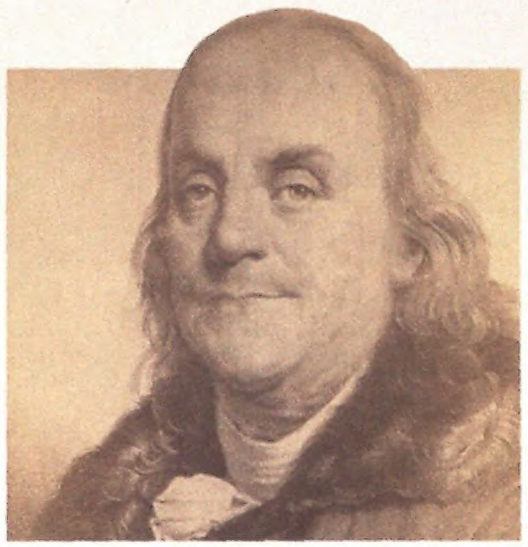
Some heroes with the right stuff never left the ground.

Smithsonian
AUGUST 2003 VOLUME 34, NUMBER 5

FEATURES

"A GOOD PULP COVER told a story in a flash: a handsome flyboy hurtles through the air upside down, his mouth open in a scream, his fist clutching the ring of his rip cord."
—"GUYS AND MOLLS," PAGE 54

60 Like squabbling human couples, bonobos will often kiss and make up after a fight.



80 By 1775, Benjamin Franklin believed a breach with Britain was inevitable.

72 "It's now cool to play chess," says Jennifer Shahade (left) with fellow champ Irina Krush.

42 FIRE FIGHT

The Forest Service and environmentalists are at odds over the best way to manage the nation's incendiary forests
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54 GUYS AND MOLLS

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60 RETHINKING PRIMATE AGGRESSION

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BY RICHARD CONNIFF / PHOTOGRAPHS BY FRANS DE WAAL

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Smart, young and hip, 2002 U.S. women's champion Jennifer Shahade is proving that chess is not just a game of squares
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80 BENJAMIN FRANKLIN JOINS THE REVOLUTION

Though the elder statesman did everything he could to avoid war, his eventual commitment to it proved persuasive
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90 SHORE THING

Boston's new 1,600-acre Harbor Islands national park beckons visitors with picaresque history and raw beauty
BY DOUG STEWART / PHOTOGRAPHS BY BOB KRIST

42 Fighting fire with fire: Near Nogales, Arizona, firefighter Melanie O'Daniel sets a backfire to stop the oncoming blaze.

ON THE COVER Many an artist in the 1930s and '40s cut their teeth on pulp covers. "Pulp Picasso" Rafael de Soto's "Softly Creep and Softly Kill" appeared on the August 1947 *Detective Tales*.

FRANS DE WAAL; PICTURE HISTORY; SYLVIA PLACHY; DAVID SANDERS / ARIZONA DAILY STAR / REUTERS

Smithsonian
AUGUST 2003 VOLUME 34, NUMBER 5

DEPARTMENTS

"PRODDED BY BOOZY DARES, bikers raced one another down the main drag. Others spun rubber doughnuts on the pavement, or popped up their front tires and balanced on their back wheels."
—"WILD THING," PAGE 32

98 We're in for Lewis & Clark celebrations galore (here, in Williamsburg, Virginia). And why not?

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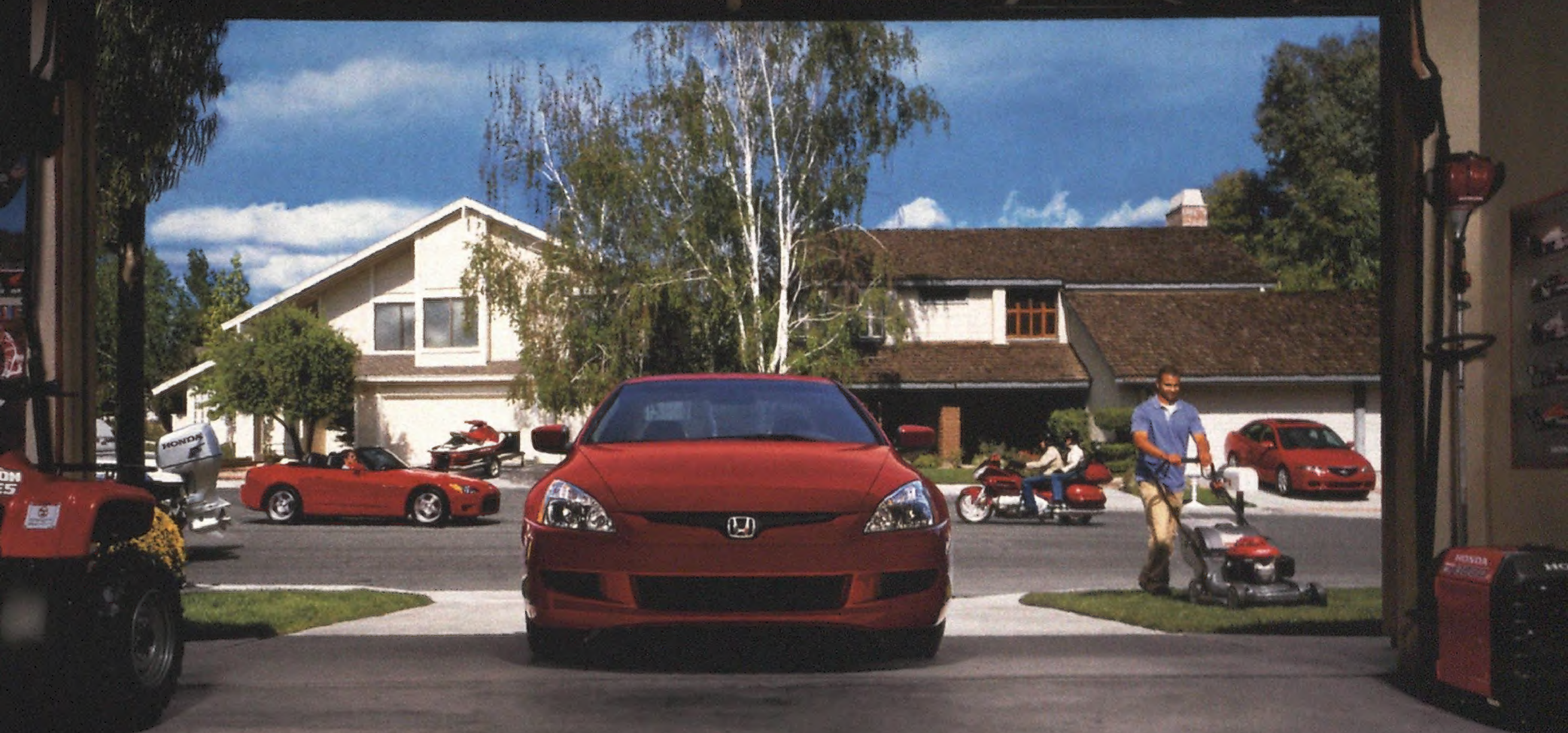

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Greener Pastures

Some things do get better

BY CAREY WINFREY

SIXTEEN YEARS AGO Paul Hoffman wrote an article for SMITHSONIAN about giving up chess because, as a teenager, he had become too obsessed with the game. He also felt that tournament participants constituted a "white-male club of social misfits." Three years ago he took up the game again and found it entirely changed, with "well-adjusted kids of both genders; players of all races, creeds and colors, and lots of immigrants from Russia and Eastern Europe." Hoffman, the former editor in chief of *Discover* magazine, attributes the new and improved U.S. chess scene to many factors, from the success of the 1993 movie *Searching for Bobby Fischer*, to Harry Potter's enthusiasm for the game, to the immigration of top Russian players to the United States, to the widespread teaching of chess in schools.

No one exemplifies chess's new face better than 22-year-old Jennifer Shahade, perhaps the strongest U.S.-born female to play the game, whom Hoffman profiles in "Chess Queen," p. 72. In the course of his reporting, Hoffman got to play Shahade in a casual "blitz" game (in which each side has a total of five minutes to make every move). He held his own for a while in a Najdorf variation of the Sicilian, a thorny opening favored by Bobby Fischer and current world champion Garry Kasparov. "But I ran out of time trying to see through the complications that she had cleverly created," Hoffman says. "The virtue of a five-minute game is that the pain is over quickly."

MIG GREENGARD

Kasparov (left) and Hoffman: Pain over quickly.

LONGTIME, PROLIFIC CONTRIBUTOR Doug Stewart wrote two pieces in this issue, one about the art that graced, if that's the word, the covers of the pulp magazines of the 1930s and '40s ("Guys and Molls," p. 54), the other about Boston's harbor islands ("Shore Thing," p. 90). About the latter he asks: "How many national parks have a bomb-disposal facility, a 500-bed homeless shelter, a set of old Nike missile silos and a former FBI safe house? Not to mention a $3.8 billion waste treatment plant that tourists are invited to visit?"

For Stewart, who worked for several years in the late 1970s and early '80s on Boston's Commercial Wharf, a big surprise was "how clear the waters of Boston Harbor have become. Ten years ago, if you dipped an oar in the harbor, you couldn't see the blade. Now you can see the bottom 20 feet down."

Even more surprising was how few people know about Boston's islands. "When I interviewed ten groups of tourists outside the Paul Revere House on Boston's venerable Freedom Trail a few blocks from the waterfront," says Stewart, "no one had even heard there was a park in the harbor—including a couple that had just returned from a narrated harbor cruise!"

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Baywatch

Smithsonian scientists' study of the Chesapeake may benefit a wider world

NOT ALL ALIEN species are from deep space, and not all alien invasions raise a ruckus. Of particular interest to scientists at the Smithsonian Environmental Research Center (SERC), on the Chesapeake Bay in Maryland, are aliens who arrive stealthily: marine organisms that enter environments to which they're not indigenous and cause ecological and economic ruin. The use of the word "invasions," borrowed from warfare, suggests how much is at stake. The annual loss to the U.S. economy caused by these intruders—through damage done to fisheries, for example—has been estimated at $137 billion.

How do foreign aquatic species get to the Chesapeake? The ballast water released by ships traveling between distant ports is one way, and SERC has become a clearinghouse of information about "ballast-mediated invasions." Its scientists have compiled a database of more than 600 invasive species along U.S. coasts, of which about 160—including the European green crab, the Chinese mystery snail, Asiatic clams and various families of tube worms—are found in the Chesapeake Bay. The bay has undergone an environmental transformation, and not for the better.

Scientists use monitors on the bay's blue crabs in hopes of collecting data that may help preserve the population.

SERC (pronounced like the *circ-* of circle) is ideally situated on 2,800 acres of forest, cropland, pasture, freshwater wetlands, tidal marshes, and estuaries along the shore of the Chesapeake, and those alien marine species are but one of its concerns. In fact, SERC is now the world's leading center for the comprehensive study of coastal zones, where varied ecosystems interact with one another and are affected by linkages between their aquatic, terrestrial and atmospheric components. The mission of the researchers at SERC is to make sense of these complex settings where land and sea meet. Their work has a special urgency because fully 70 percent of the world's growing population now inhabits coastal zones, and most of the world's environmental challenges are being played out amid the zones' ecosystems.

The Smithsonian is fortunate to own all the acres that are SERC's natural laboratory. Nowhere else do researchers have such unfettered opportunity to explore, at a permanent research site, the interaction of linked ecosystems. SERC's research is patient and extensive, reflecting more than three decades of environmental change in the nation's largest estuary. What SERC scientists learn bears on environmental issues around the globe, so they extend their studies through a far-flung network of comparative field research sites and collaborators. The knowledge gained locally mounts an invasion of its own, entirely beneficial, and makes its way across the world's latitudes.

The species with the greatest sustained commercial catch in the Chesapeake is the blue crab, long a symbol of the bay and a source of livelihood for many inhabitants of the region. But even blue crab stock has declined by more than 80 percent in the past dozen years. SERC scientists have amassed decades of information about the crabs, in part by fitting hundreds of the species with biotelemetry devices to monitor their behavior. Burdened by wires and tape, the crabs seem unlikely research recruits. The data they send back from the deep may, in time, allow our scientists to devise solutions that preserve blue crab fishery in the bay. And in the survival of one species, there may be hope for others. Through their meticulous study of the intricate life along the Chesapeake, SERC scientists are helping to sustain coastal ecosystems around the world.

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Readers respond to the June issue:

IRAQ'S LOST ANTIQUITIES

IT IS TRAGIC that the Bush administration overlooked information about the dangers to Iraq's treasures ("Saving Iraq's Treasures") and the possibility of widespread looting by a deprived population suddenly set free after years of despotic rule.

MILTON E. BALLARD
TUCSON, ARIZONA

ANY LOSS of ancient artifacts from the National Museum in Baghdad falls directly on the shoulders of the Iraqis and no one else. In spite of efforts to blame others, the Iraqis are the guilty ones.

WILLIAM T. BARNES
ODESSA, TEXAS

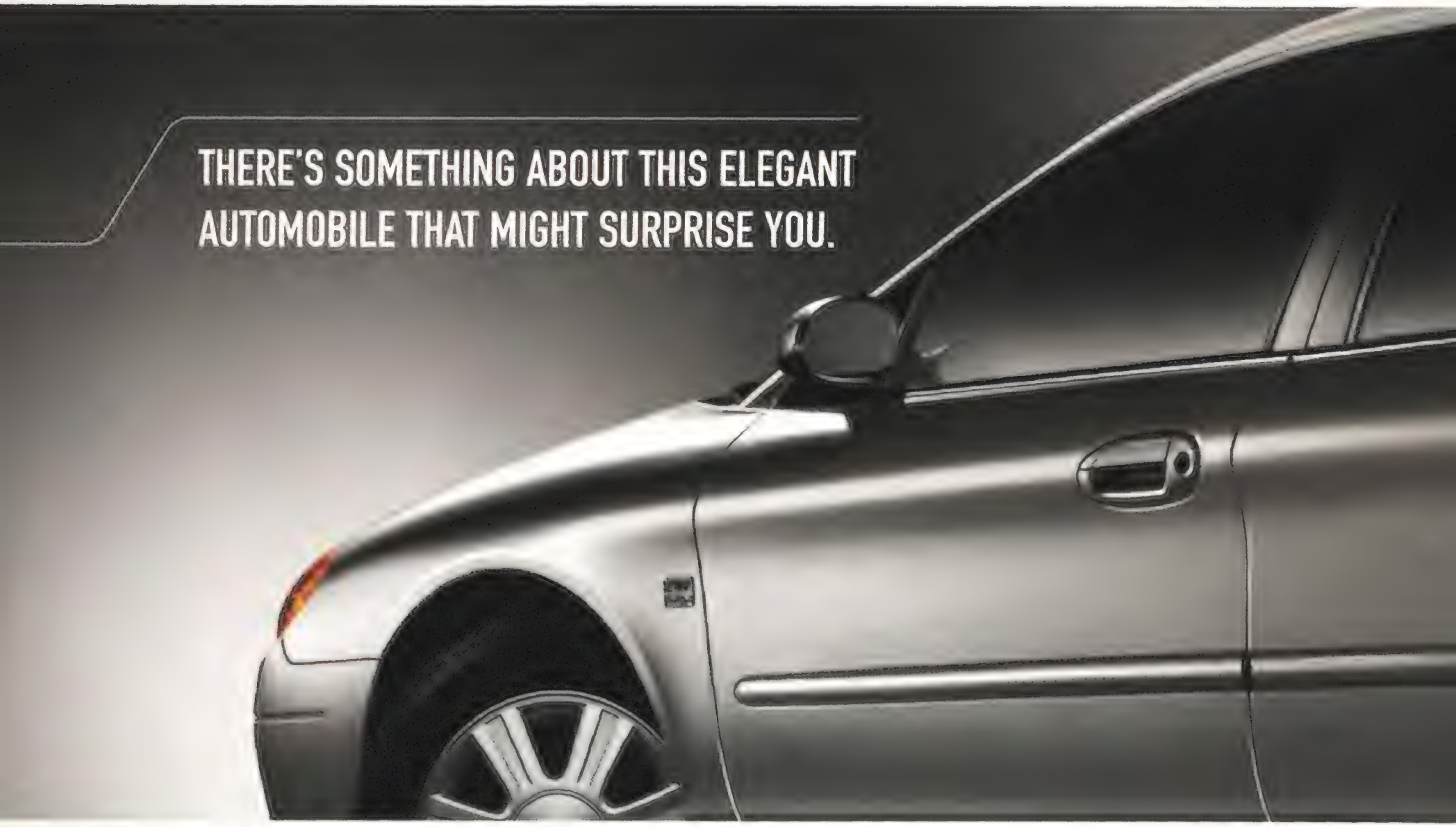
SAMARRA may be a wonder, but the comment that in A.D. 850 "Europeans were still erecting crude churches" rather neglects the Hagia Sophia, one of the greatest wonders of Christendom. This magnificent church was completed in Constantinople around A.D. 530, more than 300 years earlier.

LAWRENCE FRANKO
CONCORD, MASSACHUSETTS

ELEPHANTINE ADDENDUM

"GREAT EXPECTATIONS" highlights the importance of captive-elephant breeding programs to the survival of African and Asian elephants. But the article neglects contributions by commercial exhibitors. Feld Entertainment, the parent company of Ringling Bros. and Barnum & Bailey, owns more than 55 elephants and operates the Center for Elephant Conservation in Florida. Since 1992, fifteen Asian elephant calves have been born there, and another calf is due later this year. These account for nearly half (45 percent) of the Asian elephants born in the United States in that period. The future of elephants in North America, while still uncertain, is a bit more promising than your article suggests.

JOHN KIRTLAND
FELD ENTERTAINMENT, INC.
VIENNA, VIRGINIA



ECO-HYPOCRISY?

ONE CANNOT READ about Carl Hiaasen's noble environmental battle to preserve the Everglades ("Land Shark") without sensing some small personal hypocrisies. Hiaasen's family home overlooks Florida Bay—though he has opposed waterfront development. He disparages Jet Skiers, but tools around in a motorized skiff. He had his wife purchase lettuce for feeding manatees (which he admitted is improper and is also possibly illegal). The issue is summed up in the article's last sentence, in which Hiaasen is described as "gathering strength to battle the forces that would destroy his world." Environmentalists ought not to expect us to forgo what they themselves enjoy. The world is not theirs alone.

ROBERT SOLOMAN
BROOKLYN , NEW YORK

SEEING MUCH of Florida's beauty bulldozed for progress and profit is infuriating. Having fought developers and politicians, we have won some battles while losing others. Hiaasen is a champion and an inspiration for all we really love about Florida.

RANDY RICHENBERG
NEW SMYRNA BEACH, FLORIDA

JEFFERSON'S CABINET CONFIRMED

IT APPEARS that the world's greatest deliberative body ("Capitol Discovery," about the Senate ledger dating to 1790 that was found this past November) deliberated a little too long if it advised and consented to the appointment of President John Adams' entire cabinet on March 4, 1801, as your article states. That was the day Thomas Jefferson became president.

ROBERT BOND
VIRGINIA BEACH, VIRGINIA

It was indeed Jefferson's cabinet that the Senate so speedily confirmed, on March 5, 1801. We regret the errors. —Ed.

CLONING'S PERVERSE INCENTIVES

IF SCIENTISTS could just clone a species that has died off because of human irresponsibility ("True or False? Extinction is Forever"), where is the incentive to reform? Cloning would appear to remove the consequences of overhunting, pollution and habitat destruction. The incredible effort and millions of dollars being poured into cloning research could be put to better use saving threatened habitats and also imperiled-but-still-with-us species before they go the way of the dodo.

WILL ASHENMACHER
KNIFE RIVER, MINNESOTA

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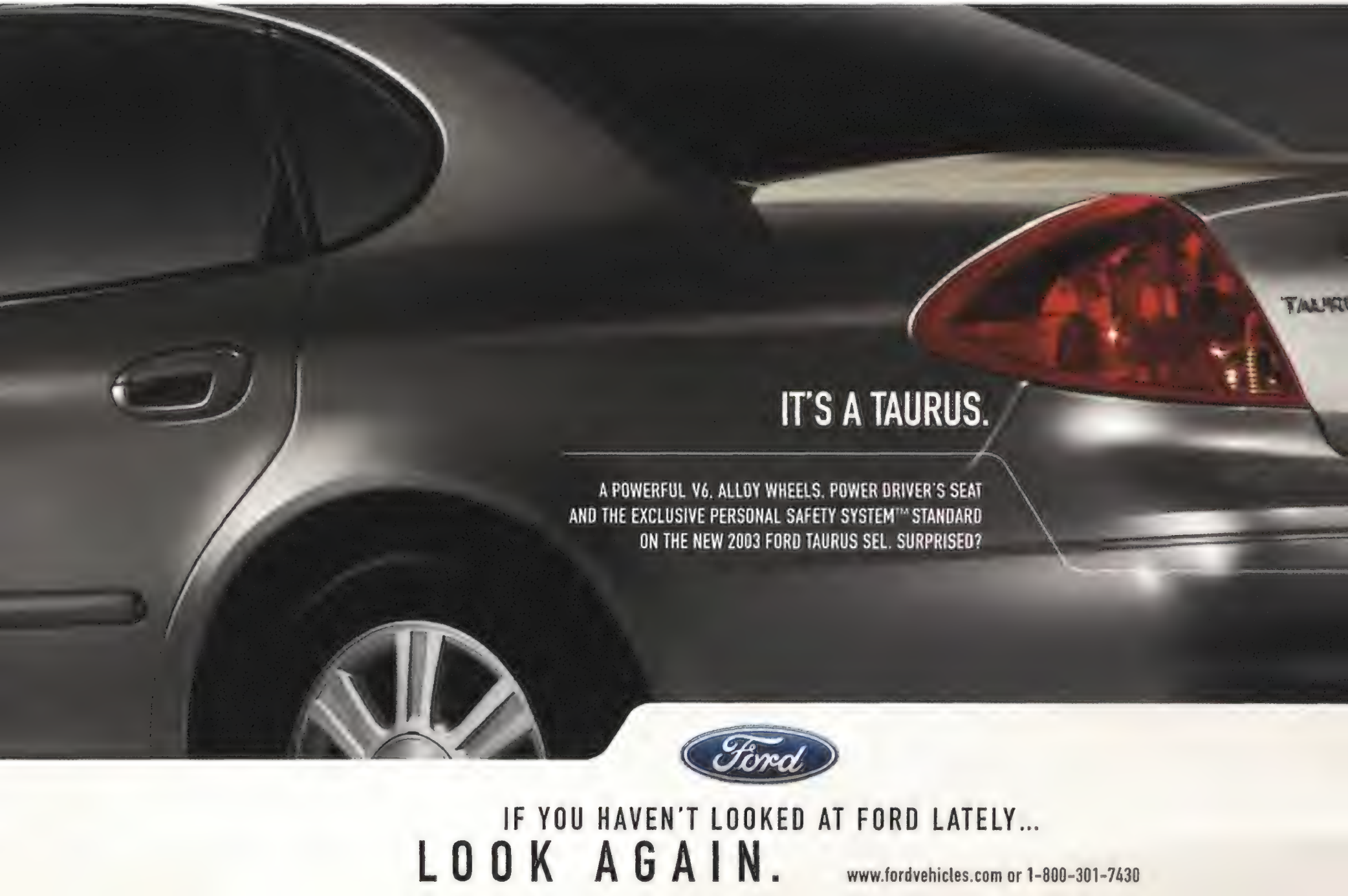
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THIS MONTH IN HISTORY

AUGUST ANNIVERSARIES—MOMENTOUS OR MERELY MEMORABLE

225 YEARS AGO: BRAVA!
One of the world's preeminent opera houses, La Scala, opens in Milan August 3, 1778, with Salieri's *L'Europa riconosciuta*. Among the enduring works that will premiere there are Verdi's *Otello* and *Falstaff*, Puccini's *Madame Butterfly* and Bellini's *Norma*. The neoclassical building, damaged in World War II, is once again undergoing renovations.

25 YEARS AGO: CROSSING THE POND
Ben Abruzzo, Maxie Anderson and Larry Newman complete the first transatlantic balloon flight August 17, 1978, in the helium craft *Double Eagle II*. Departing from Presque Isle, Maine, the Americans land near Paris after five days and 17 hours aloft. Their flight home on the supersonic Concorde jet takes 3 1/2 hours.

120 YEARS AGO: VEHEMENT VOLCANO
The eruption of Indonesia's Krakatau, among history's most notorious catastrophes, spews steam and rock 50 miles into the air and rains ash for thousands of miles. Tidal waves devastate coastal Java and Sumatra, killing more than 36,000. Krakatau dust long reddens sunsets worldwide.

40 YEARS AGO: ROAD TO PEACE
In Moscow on August 5, 1963, officials of the United States, Britain and the Soviet Union sign the first nuclear test-ban treaty, agreeing not to test nuclear devices in the air, in space or underwater. It's a "first step on the road to a secure and peaceful world," says Secretary of State Dean Rusk. Two months later, President John F. Kennedy ratifies the treaty (above), a high point of his administration.

75 YEARS AGO: THINK PINK
In August of 1928, after months of experimenting, Walter Diemer, an accountant for a chewing gum company, invents an especially elastic gum that won't stick to skin. Dubble Bubble will soon burst onto the scene—the first bubble gum ever marketed. Once penny candy, bubble gum is now big business, with annual sales approaching half a billion dollars.

130 YEARS AGO: WE HAVE CABLE
The world's first cable car eases down a San Francisco street August 2, 1873, in a test devised by Englishman Andrew Hallidie, a wire rope maker. Today, 40 cars, which grip a cable coursing beneath the pavement, run on the city's three cable lines. O

—ALISON MCLEAN

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Smithsonian Institution Photo by Beth A. Laakso

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Not published at the time, Adelman's photograph of King shouting "Free at last!" would become one of the defining images of the era.

BOB ADELMAN / MAGNUM PHOTOS

Dream Assignment

Photographer Bob Adelman's picture of Martin Luther King, Jr., taken 40 years ago, captures one of the greatest speeches in American history ~ BY LUCINDA MOORE

A QUARTER OF A MILLION people gathered near the Lincoln Memorial in the nation's capital for the March on Washington for Jobs and Freedom. It was August 28, 1963, and many there that day knew the final speaker as an activist who had led groundbreaking civil rights protests in the heart of Dixie. But the world would soon know Martin Luther King, Jr., as the man who awakened the soul of a nation with one of the most important orations in American history.

King, the head of the Southern Christian Leadership Conference, one of five civil rights groups that organized the march, began with prepared remarks noting that "five score years ago, a great American, in whose symbolic shadow we stand today, signed the Emancipation Proclamation." But deep into his 16-minute address, King began to improvise, drawing on his extraordinary gifts as a preacher. "I have a dream that one day this nation will rise up and live out the true meaning of its creed: 'We hold these truths to be self-evident, that *all* men are created equal,' " he said. King, who was only 34, had used the "I have a dream" phrase in other speeches, but never so stirringly or so memorably.

Bob Adelman, a photographer's assistant then 32 years old, was near the podium. "I kept getting closer until I must've

The crowd released a "great cry like the sound of the heavens being torn open."

During King's speech, Adelman also photographed the rapt, record crowd of 250,000.

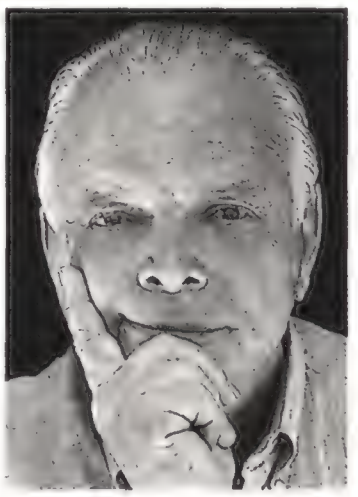
been only seven or eight feet away," he recalls. "I took 80 to 90 frames of him speaking. It was probably the greatest moment in his life and the greatest moment in mine."

"I have a dream," King went on, "that my four little children will one day live in a nation where they will not be judged by the color of their skin but by the content of their character. I have a dream today!"

People in the front row joined hands and began swaying, says Drew Hansen, author of a new book, *The Dream: Martin Luther King, Jr. and the Speech that Inspired a Nation*. King was a "poet who could take the words of the King James Bible, the Constitution and the Declaration of Independence and make them uniquely his own," Hansen says.

By the time King thundered "Let freedom ring! Let freedom ring from Lookout Mountain of Tennessee," some in the crowd were weeping. Tension mounted, and at the end of King's address, his voice booming yet lyrical, he called for the day "When all of God's children—black men and white men, Jews and Gentiles, Protestants and Catholics—will be able to join hands and sing in the words of the old Negro spiritual, 'Free at last, free at last, thank God Almighty, we are free at last!' " The crowd released a "great cry like the sound of the heavens being torn open," Hansen writes.

Julian Bond, chairman of the NAACP and a former Georgia congressman, was also at the event, which was carried by radio and television. "For the first time a mass white audience heard the undeniable justice of black demands," Bond later recalled. King himself referred to the occasion as that "radiant August day."



Adelman (in 2000) has coauthored 30 books.

King was born in Atlanta in 1929. His father was a Baptist minister and his mother, a schoolteacher. He started college at 15 and obtained his doctorate in theology at Boston University. He found in Mahatma Gandhi's nonviolent approach to reform a "moral and practical way to struggle against social injustice."

Starting in the 1950s, King led numerous demonstrations, including the 1955-1956 Montgomery Bus Boycott, which ended segregation on the public transit system in Alabama. Still, many regard the "Dream" speech as his apotheosis. The oration is cherished because it marks a "hopeful and triumphant time in King's career and in the trajectory of the civil rights movement," Hansen says. Among the era's triumphs were the Civil Rights Act of 1964, barring segregation in public places; the 24th Amendment to the Constitution, ratified in 1964, prohibiting the poll tax; and the 1965 Voting Rights Act, abolishing literacy tests as a requirement for registering to vote.

In 1968, King, who was awarded the Nobel Peace Prize in 1964, was in Memphis supporting striking sanitation workers when he gave his last public address. "Longevity has its place," he said. "But I'm not concerned about that now." He went on, "I may not get there with you. But . . . we as a people will get to the promised land." He was assassinated the next day, April 4.

A quarter century after King's death, Bond said Americans had realized only half of King's dream. Today, he says, "the fact that the jobless rate for blacks remains twice that of whites is an indication of how little things have changed."

Adelman went on to work as a freelance photographer, taking pictures of Andy Warhol for *Esquire* and Roy Lichtenstein for *Life*, among many others. Now 72 and living in Miami Beach, he is working on a book of his Warhol photographs and a book of his photographs of African-Americans. He is the author or coauthor of 30 books, including 2000's *King: The Photobiography of Martin Luther King, Jr.* He remembers the 1963 march vividly: "There are not a lot of times and places where one's ideals and the real world come together, but that was one of those places." ○

LUCINDA MOORE, an associate editor at SMITHSONIAN, wrote last about Maya Angelou.

BOB ADELMAN / MAGNUM PHOTOS; CHRISTOPHER CATALDO

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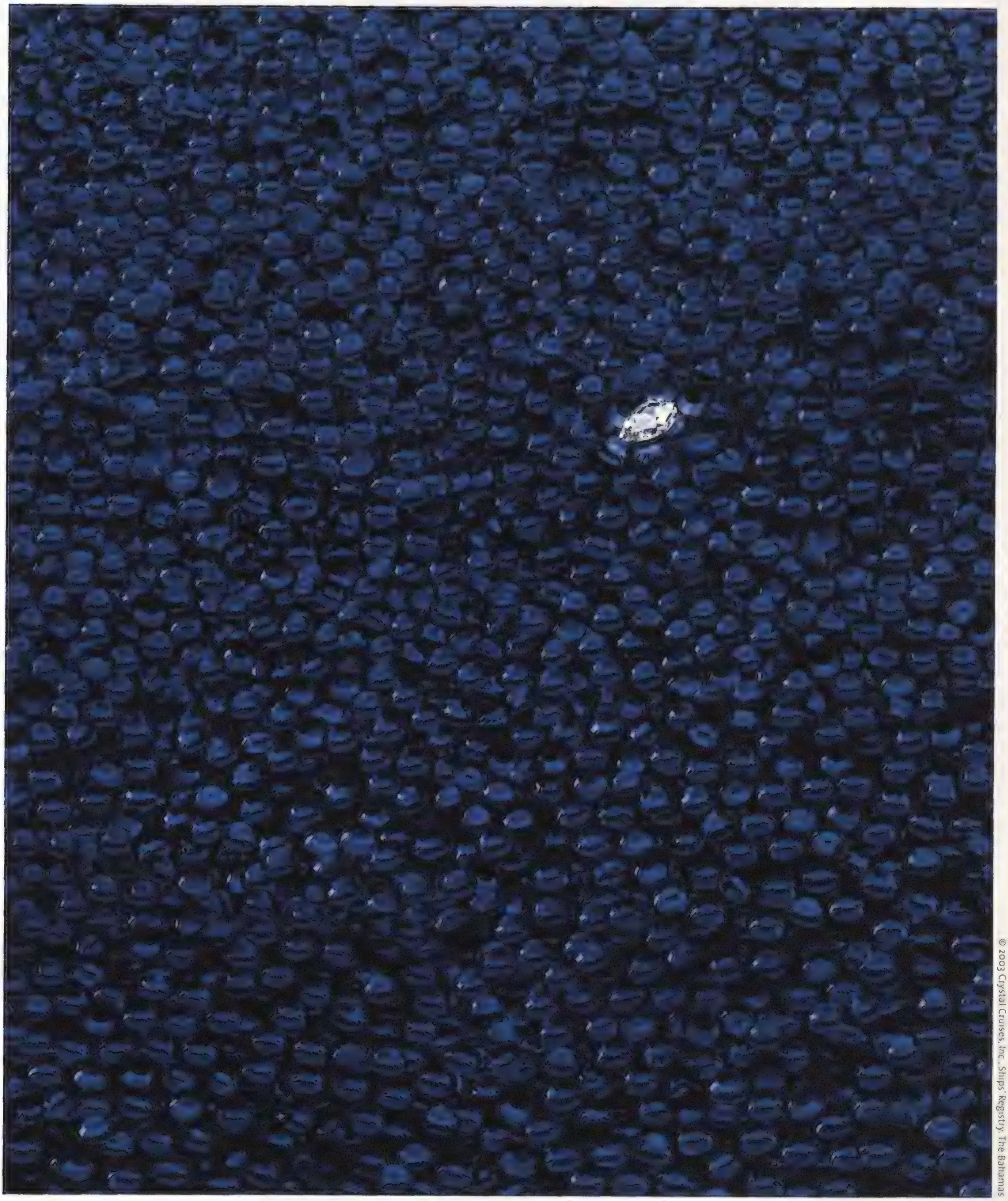

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CRYSTAL CRUISES

A STORY IN PROGRESS

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Going above and beyond with OnStar. It gets directions and makes reservations.[3] It even saves lives. Is there anything OnStar doesn't do? Not really. This GM-pioneered innovation has been the standard ever since we launched it seven years ago. And today, some 22 million customer contacts later, we're still going beyond the call. Here's a look at how OnStar helped last month:

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[1]OnStar uses existing emergency service providers and cellular telephone and satellite technologies. Vehicle electrical system must be operating for OnStar to work. Call 1-800-4-ONSTAR or visit www.onstar.com for system limitations and details. [2]Available in the 48 contiguous states. Activation fee and service subscription are extra. Go to www.xmradio.com for details. [3]Services vary depending on service plan purchased.

Fakahatchee Ghosts

But no exorcisms, please—these rare orchids are the stars of a hit movie and a best-selling book ~ BY JACK MCCLINTOCK

"Gosh, once there were 40 species here, and I've seen 33," says Owen, ever on the lookout for rare orchids, especially the elusive ghost (left).

ON A WARM Florida afternoon, Mike Owen steps off a forest trail into dark, knee-deep water. He pockets the little yellow waterproof notebook in which he records everything he sees in the Fakahatchee Strand State Preserve and sloshes deeper into the swampy shadows. "You're within 250 feet of 12 species of orchid," he calls over his shoulder to four hikers. "But you won't see 'em if you don't get in the water."

But the hikers stay on the trail, and Owen shrugs. A resident biologist at the preserve, he's used to people who don't want to get their feet wet. After all, the place is full of snakes—22 species of them, including pygmy rattlesnakes and cottonmouth moccasins. Then there are the alligators, manatees, Everglades mink, panthers and black bears. Not even Owen will come into the swamp at night or alone in daytime. "Too risky, too easy to get hurt," he says.

Despite the dangers, Owen, 43, is one of those happy few working precisely the job they want. "I'll probably never leave," he says, smiling. He came to the Fakahatchee in 1993 after stints as a park ranger and a fisheries department field technician. With a volley of facts and a boyish flood of *wows* and *goshes*, he explains the swamp's history, topography, plant and animal life to a steady stream of visitors, up from about 300 a day to 350 since the 1998 publication of Susan Orlean's best-selling book, *The Orchid Thief*, which tells the true story of an obsessive collector named John Laroche and his scheme to poach the Fakahatchee's rare orchids. The book was also the basis of the 2002 movie *Adaptation*, starring Nicolas Cage, Chris Cooper as Laroche and Meryl Streep as Orlean. (Of Cooper's portrayal of Laroche, Owen says, "That's him! So conceited, and very intelligent!")

Since the book and movie came out, thieves have made off with four more endangered orchids, and now Owen takes visitors on "indirect routes" during swamp walks to see the exquisite plants. "I have to be real careful," he says. "I could have an orchid poacher with me."

There are about 25,000 wild native orchids in the world and perhaps 100,000 hybrids, he says. "The Fakahatchee is the orchid capital of the country. It has the most species of anyplace in the United States, half tropical and half temperate."

Among them is the legendary ghost orchid—*Dendrophylax lindenii*. Leafless with bright white spindly petals on slender spikes, the flower seems to float in the air. It was the ghost that Laroche sought most fanatically and that provided the centerpiece of Orlean's book, and it's the ghost we're seeking today.

THE FAKAHATCHEE Strand State Preserve, 80 miles west of Fort Lauderdale, is a two-foot-deep, 5-by-20-mile

MARESA PRYOR; CONNIE BRANSILVER

When chemo made me tired I found my strength in time for peak season.

If you're on chemotherapy, and finding it difficult to do the things you normally do, it's important to tell your doctor about your symptoms. You may actually be anemic and not even know it. In fact, anemia affects 7 out of 10 chemotherapy patients, and can cause extreme tiredness, dizziness and shortness of breath. When you are anemic, you may also find it difficult to think clearly. Furthermore, chemo-related anemia may cause you to interrupt your treatment. Fortunately, there's PROCRIT. It treats chemo-related anemia by helping you regain red blood cells lost during chemotherapy, and more red blood cells can mean more strength. Help your doctor help you. Report your symptoms, and ask if PROCRIT is right for you.

PROCRIT is for chemotherapy-related anemia in patients with most types of cancer. PROCRIT is proven and safe. PROCRIT is available by prescription only and is injected by your doctor or nurse. In studies, diarrhea, edema, fever, vomiting, shortness of breath, tingling, and upper respiratory infection occurred more often with PROCRIT than placebo. Although high blood pressure has been noted rarely in cancer patients treated with PROCRIT, blood pressure should be monitored carefully, particularly in patients with a history of high blood pressure or heart disease. Please see the following brief summary of Prescribing Information.

PROCRIT®
EPOETIN ALFA
Strength for Living®

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BRIEF SUMMARY OF PRESCRIBING INFORMATION INDICATED FOR THE TREATMENT OF ANEMIA OF CANCER PATIENTS ON CHEMOTHERAPY

PROCRIT®
EPOETIN ALFA
For Injection

FOR FULL PRESCRIBING INFORMATION FOR ALL INDICATIONS, REFER TO THE *PHYSICIANS' DESK REFERENCE®*

INDICATIONS AND USAGE

PROCRIT® (Epoetin alfa) is indicated for the treatment of anemia in patients with nonmyeloid malignancies where anemia is due to the effect of concomitantly administered chemotherapy. PROCRIT is indicated to decrease the need for transfusions in patients who will be receiving concomitant chemotherapy for a minimum of 2 months. PROCRIT is not indicated for the treatment of anemia in cancer patients due to other factors such as iron or folate deficiencies, hemolysis, or gastrointestinal bleeding, which should be managed appropriately.

CONTRAINDICATIONS

PROCRIT is contraindicated in patients with: 1) Uncontrolled hypertension; 2) Known hypersensitivity to mammalian cell-derived products; 3) Known hypersensitivity to Albumin (Human).

WARNINGS

Pediatric Use: The multidose preserved formulation contains benzyl alcohol. Benzyl alcohol has been reported to be associated with an increased incidence of neurological and other complications in premature infants, which are sometimes fatal.

Pure Red Cell Aplasia

Pure red cell aplasia (PRCA), in association with neutralizing antibodies to native erythropoietin, has been observed in patients treated with recombinant erythropoietins. PRCA has been reported in a limited number of patients exposed to PROCRIT. This has been reported predominantly in patients with CRF. Any patient with loss of response to PROCRIT should be evaluated for the etiology of loss of effect (see PRECAUTIONS: Lack or Loss of Response). PROCRIT should be discontinued in any patient with evidence of PRCA and the patient evaluated for the presence of binding and neutralizing antibodies to PROCRIT, native erythropoietin, and any other recombinant erythropoietin administered to the patient. Amgen/Ortho Biotech Products, L.P. should be contacted to assist in this evaluation. In patients with PRCA secondary to neutralizing antibodies to erythropoietin, PROCRIT should not be administered and such patients should not be switched to another product as anti-erythropoietin antibodies cross-react with other erythropoietins (see ADVERSE REACTIONS).

PRECAUTIONS

The parenteral administration of any biologic product should be attended by appropriate precautions in case allergic or other untoward reactions occur (see CONTRAINDICATIONS). In clinical trials, while transient rashes were occasionally observed concurrently with PROCRIT therapy, no serious allergic or anaphylactic reactions were reported. (See ADVERSE REACTIONS for more information regarding allergic reactions.)

The safety and efficacy of PROCRIT therapy have not been established in patients with a known history of a seizure disorder or underlying hematologic disease (eg, sickle cell anemia, myelodysplastic syndromes, or hypercoagulable disorders).

In some female patients, menses have resumed following PROCRIT therapy; the possibility of pregnancy should be discussed and the need for contraception evaluated.

Hematology: Exacerbation of porphyria has been observed rarely in patients with chronic renal failure (CRF) treated with PROCRIT. However, PROCRIT has not caused increased urinary excretion of porphyrin metabolites in normal volunteers, even in the presence of a rapid erythropoietic response. Nevertheless, PROCRIT should be used with caution in patients with known porphyria.

In preclinical studies in dogs and rats, but not in monkeys, PROCRIT therapy was associated with subclinical bone marrow fibrosis. Therefore, cancer patients should have hematocrit (HCT) measured once a week (QW) until HCT has been stabilized, and measured periodically thereafter.

Lack or Loss of Response: If the patient fails to respond or to maintain a response to doses within the recommended dosing range, the following etiologies should be considered and evaluated: 1) Iron deficiency: Virtually all patients will eventually require supplemental iron therapy (see Iron Evaluation). 2) Underlying infectious, inflammatory, or malignant processes. 3) Occult blood loss. 4) Underlying hematologic diseases (ie, thalassemia, refractory anemia, or other myelodysplastic disorders). 5) Vitamin deficiencies: folic acid or vitamin B12. 6) Hemolysis. 7) Aluminum intoxication. 8) Osteitis fibrosa cystica.

In the absence of another etiology, the patient should be evaluated for evidence of PRCA and sera should be tested for the presence of antibodies to recombinant erythropoietins.

Iron Evaluation: During PROCRIT therapy, absolute or functional iron deficiency may develop. Functional iron deficiency, with normal ferritin levels but low transferrin saturation, is presumably due to the inability to mobilize iron stores rapidly enough to support increased erythropoiesis. Transferrin saturation should be at least 20% and ferritin should be at least 100 ng/mL.

Prior to and during PROCRIT therapy, the patient's iron status, including transferrin saturation (serum iron divided by iron binding capacity) and serum ferritin, should be evaluated. Virtually all patients will eventually require supplemental iron to increase or maintain transferrin saturation to levels which will adequately support erythropoiesis stimulated by PROCRIT.

Drug Interactions: No evidence of interaction of PROCRIT with other drugs was observed in the course of clinical trials.

Carcinogenesis, Mutagenesis, and Impairment of Fertility: Carcinogenic potential of PROCRIT has not been evaluated. PROCRIT does not induce bacterial gene mutation (Ames Test), chromosomal aberrations in mammalian cells, micronuclei in mice, or gene mutation at the HGPRT locus. In male and female rats treated intravenously (IV) with PROCRIT, there was a trend for slightly increased fetal wastage at doses of 100 and 500 U/kg.

Pregnancy Category C: PROCRIT has been shown to have adverse effects in rats when given in doses 5 times the human dose. There are no adequate and well-controlled studies in pregnant women. PROCRIT should be used during pregnancy only if potential benefit justifies the potential risk to the fetus.

In studies in female rats, there were decreases in body weight gain, delays in appearance of abdominal hair, delayed eyelid opening, delayed ossification, and decreases in the number of caudal vertebrae in the F1 fetuses of the 500 U/kg group. In female rats treated IV, there was a trend for slightly increased fetal wastage at doses of 100 and 500 U/kg.

Nursing Mothers: Postnatal observations of the live offspring (F1 generation) of female rats treated with PROCRIT during gestation and lactation revealed decreases in body weight gain, delays in appearance of abdominal hair, eyelid opening, and decreases in the number of caudal vertebrae in the F1 fetuses of the 500 U/kg group. It is not known whether PROCRIT is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when PROCRIT is administered to a nursing woman.

Pediatric Use: See WARNINGS, Pediatric Use.

Pediatric Cancer Patients on Chemotherapy: Published literature has reported the use of PROCRIT in approximately 64 anemic pediatric cancer patients ages 6 months to 18 years, treated with 25 to 300 U/kg subcutaneously (SC) or IV, 3 to 7 times per week. Increases in hemoglobin and decreases in transfusion requirements were noted.

Hypertension: Hypertension, associated with a significant increase in HCT, has been noted rarely in cancer patients treated with PROCRIT. Nevertheless, blood pressure (BP) in patients treated with PROCRIT should be monitored carefully, particularly in patients with an underlying history of hypertension or cardiovascular disease.

Seizures: In double-blind, placebo-controlled trials, 3.2% (N=2/63) of patients treated with PROCRIT and 2.9% (N=2/68) of placebo-treated patients had seizures. Seizures in 1.6% (N=1/63) of patients treated with PROCRIT occurred in the context of a significant increase in BP and HCT from baseline values. However, both patients treated with PROCRIT also had underlying CNS pathology which may have been related to seizure activity.

Thrombotic Events: In double-blind, placebo-controlled trials, 3.2% (N=2/63) of patients treated with PROCRIT and 11.8% (N=8/68) of placebo-treated patients had thrombotic events (eg, pulmonary embolism, cerebrovascular accident).

Growth Factor Potential: PROCRIT is a growth factor that primarily stimulates red cell production. However, the possibility that PROCRIT can act as a growth factor for any tumor type, particularly myeloid malignancies, cannot be excluded.

ADVERSE REACTIONS

Immunogenicity

As with all therapeutic proteins, there is the potential for immunogenicity. Cases of antibody-induced PRCA in patients treated with recombinant human erythropoietins have been described in publications.

Very rare occurrences of PRCA and the presence of antibodies with neutralizing activity have been reported since market introduction of PROCRIT in the United States (see WARNINGS: Pure Red Cell Aplasia). Cases have been observed in patients treated by both SC and IV routes of administration. Among reported cases where the route of administration is known, PRCA has been observed more with SC administration than IV administration.

The incidence of antibody formation is highly dependent on the sensitivity and specificity of the assay. Additionally, the observed incidence of antibody positivity in an assay may be influenced by several factors including sample handling, timing of sample collection, concomitant medications, and underlying disease. For these reasons, comparison of the incidence of antibodies to PROCRIT with the incidence of antibodies to other products may be misleading.

Adverse experiences reported in clinical trials with PROCRIT in cancer patients were consistent with the underlying disease state. In double-blind, placebo-controlled studies of up to 3-months duration involving 131 cancer patients, adverse events with an incidence >10% in either patients treated with PROCRIT or placebo-treated patients were as indicated below.

Percent of Patients Reporting Event: Event followed by Patients Treated With PROCRIT (N=63) first, Placebo-Treated Patients (N=68) second:
Pyrexia 29%, 19%; Diarrhea 21%,[a] 7%; Nausea 17%,[b] 32%; Vomiting 17%, 15%; Edema 17%,[c] 1%; Asthenia 13%, 16%; Fatigue 13%, 15%; Shortness of Breath 13%, 9%; Paresthesia 11%, 6%; Upper Respiratory Infection 11%, 4%; Dizziness 5%, 12%; Trunk Pain 3%,[d] 16%.
[a]P=0.041; [b]P=0.069; [c]P=0.0016; [d]P=0.017.

Although some statistically significant differences between patients treated with PROCRIT and placebo-treated patients were noted, the overall safety profile of PROCRIT appeared to be consistent with the disease process of advanced cancer. During double-blind and subsequent open-label therapy in which patients (N=72 for total exposure to PROCRIT) were treated for up to 32 weeks with doses as high as 927 U/kg, the adverse experience profile of PROCRIT was consistent with the progression of advanced cancer.

Based on comparable survival data and on the percentage of patients treated with PROCRIT and placebo-treated patients who discontinued therapy due to death, disease progression or adverse experiences (22% and 13%, respectively; P=0.25), the clinical outcome in patients treated with PROCRIT and placebo-treated patients appeared to be similar. Available data from animal tumor models and measurement of proliferation of solid tumor cells from clinical biopsy specimens in response to PROCRIT suggest that PROCRIT does not potentiate tumor growth. Nevertheless, as a growth factor, the possibility that PROCRIT may potentiate growth of some tumors, particularly myeloid tumors, cannot be excluded. A randomized controlled Phase IV study is currently ongoing to further evaluate this issue.

The mean peripheral white blood cell count was unchanged following PROCRIT therapy compared to the corresponding value in placebo-treated group.

OVERDOSAGE

The maximum amount of PROCRIT that can be safely administered in single or multiple doses has not been determined. Doses of up to 1500 U/kg 3 times weekly (TIW) for 3 to 4 weeks have been administered to adults without any direct toxic effects of PROCRIT itself. Therapy with PROCRIT can result in polycythemia if the HCT is not carefully monitored and the dose appropriately adjusted. If the suggested target range is exceeded, PROCRIT may be temporarily withheld until the HCT returns to the suggested target range; PROCRIT therapy may then be resumed using a lower dose (see DOSAGE AND ADMINISTRATION). If polycythemia is of concern, phlebotomy may be indicated to decrease the HCT.

DOSAGE AND ADMINISTRATION

Baseline endogenous serum erythropoietin levels varied among patients in these trials with approximately 75% (N=83/110) having endogenous serum erythropoietin levels <132 mU/mL, and approximately 4% (N=4/110) of patients having endogenous serum erythropoietin levels >500 mU/mL. In general, patients with lower baseline serum erythropoietin levels responded more vigorously to PROCRIT than patients with higher erythropoietin levels. Although no specific serum erythropoietin level can be stipulated above which patients would be unlikely to respond to PROCRIT therapy, treatment of patients with grossly elevated serum erythropoietin levels (eg, >200 mU/mL) is not recommended. The HCT should be monitored on a weekly basis in patients receiving PROCRIT therapy until HCT becomes stable.

Starting Dose: The recommended starting dose of PROCRIT for adults is 150 U/kg SC TIW. For pediatric patients, see PRECAUTIONS, Pediatric Use.

Dose Adjustment: If the response is not satisfactory in terms of reducing transfusion requirements or increasing HCT after 8 weeks of therapy, the dose of PROCRIT can be increased up to 300 U/kg TIW. If patients have not responded satisfactorily to a PROCRIT dose of 300 U/kg TIW, it is unlikely that they will respond to higher doses of PROCRIT. If the HCT exceeds 40%, the dose of PROCRIT should be withheld until the HCT falls to 36%. The dose of PROCRIT should be reduced by 25% when treatment is resumed and titrated to maintain the desired HCT. If the initial dose of PROCRIT includes a very rapid HCT response (eg, an increase of more than 4 percentage points in any 2-week period), the dose of PROCRIT should be reduced.

STORAGE

Store at 2° to 8°C (36° to 46°F). Do not freeze or shake.

◆

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3193603

Not even Owen will dare the swamp alone. "Too risky," he says.

channel through the limestone prairie of southwest Florida that enriches the estuaries southeast of Naples. Over the centuries, organic material collected in this shallow trough, forming a rich layer of peat. "It's like a big valley filled with sponge," Owen says.

Bald cypress trees proliferated in the nutrient-laden slough, some growing to 100 feet. During World War II, loggers harvested the rot-resistant, old-growth trees, up to six feet in diameter, to build minesweeper hulls and PT boats, and later, pickle barrels, stadium seats, shingles and coffins. The loggers' railway roadbed, with its narrow spurs jutting fingerlike into the swamp, now forms a scenic drive and a network of dry hiking trails. Today the Fakahatchee—"river with muddy banks" in Muskogee, a Seminole language—is home to the country's grandest stand of royal palms and its richest concentration of wild orchids and bromeliads.

The hikers' voices fade behind us as we slosh deeper into the dim gray-green world of water and plants, brilliant shafts of sunlight piercing the landscape at sharp angles. Owen's head darts like a wading bird's. "What you see depends on the angle of light and openness of the canopy," he says.

The water is the color of weak tea and a cool 72 degrees even in summer. Owen stops, looking up. "Here's a ribbon orchid on a pop-ash tree, nine feet up!" He records the sighting in his yellow notebook: orchid and tree species, height, water depth. "No blooms yet. October's the best month for blooms."

Entering a water-filled clearing about 20 feet wide, we navigate cypress knees poking up from the water and Spanish moss hanging from the trees. "And here's a canoe orchid!" Owen exclaims. "See the rigid keel on the leaf?"

Owen is gesturing, lecturing, ticking off points on his fingers. "It's the water, the canopy and the peat that makes it!" he says, waving a pencil. "The topography determines wetness—the strand fills with water during the rainy season, and the peat holds the water, keeps it humid so the trees can grow and protects it from desiccation and fire. The canopy shades the understory and moderates the temperature and cuts the wind." He plunges on, talking a mile a minute, deeper into the swamp.

To protect its wild beauties (clockwise from top left: clamshell, butterfly, night-scented and dingy-flowered orchids), the Fakahatchee Strand staff is on heightened alert for poachers.

"Now, here's a night-scented orchid. It blew in on a hurricane two-three-four hundred years ago, and even though there's no pollinator here, it turns out to be self-pollinating."

Owen's knowledge of orchids wasn't nearly so extensive when he first arrived at the strand, and as it happens, it was John Laroche who facilitated his education. Owen had been on the job just two months when Laroche and three Seminole Indians were caught with pillowcases and plastic bags full of rare plants, just like in the movie. "He had 92 orchids of nine species and some rare bromeliads," Owen says. (Laroche was fined $500 and banned from the park for six months.) "He was very friendly right after he was caught. We didn't know the plants like he did, so he taught us about all the orchids he had." They included the ghost.

Ghost orchids were rather common before a 1977 frost decimated them and before too many people learned to brave the dark, wet swamp. Poachers like Laroche reduced the ghost's numbers steeply. "It's a touchdown if you find one," Owen says.

As if on cue, we suddenly find ourselves staring at a ghost. Owen points at it with his pencil. "This one has no spikes, so it hasn't bloomed yet." At this stage, the plant is an unprepossessing little network of gray-green roots, like a mass of rubber bands stuck to the tree. "It blooms in June, July or August. They're pollinated at night by the sphinx moth, with a six-inch wingspan and a six-and-a-quarter-inch tongue!"

We move on, but in a few moments, Owen is glancing around uncertainly, and I think of Chris Cooper as Laroche in *Adaptation*, reassuring an up-to-her-hips-in-swamp-water Streep, "We're not lost." I stumble into a deep hole and barely catch my balance. Shadows are lengthening. I can hear the whir of night insects. It's almost dusk when we emerge from the Fakahatchee. The hikers are gone.

Owen excitedly counts up the orchids we've seen. Eleven? Twelve? As we head back to the truck, he starts telling me about ferns. ○

JACK MCCLINTOCK, a contributing editor at Discover, *lives in Florida.*

CONNIE BRANSILVER (4)

RAINBOW COALITION "There's nothing sweeter," says Abdessalam Najjar of these schoolboys on a giggle break in their local playground, "than a rainbow shared by Jewish and Palestinian kids." Najjar is mayor of an experiment: a village of 50 Jewish and Palestinian families. Called Neve Shalom/Wahat-al-Salam (Oasis of Peace), the cooperatively owned and governed village located between Jerusalem and Tel Aviv-Jaffa has, since 1972, served as an example of peace between the two peoples, who have warred since Israel was created in 1948. Second graders Mohammad Hijazi (left), Saed Abdel Rahman (middle) and Mohammad Jabber (right) attend the Hebrew-Arabic primary school with 300 children from nearby communities. Says 8-year-old Hijazi, a Palestinian, "People shouldn't live apart. I think we could cut up the flags and join them together." Najjar, 50, also Palestinian, says, "The children understand that we should share [the flag] together, without one dominating the other." Nava Sonnenschein, 49, a Jewish director of the village's School for Peace, which conducts seminars in conflict resolution, is cautiously hopeful about the current "road map for peace": "But it's not enough just talking. We need to see action." Eight-year-old Boniel Ofri, who is Jewish, offers some advice for Israeli prime minister Ariel Sharon and the Palestinian Authority's prime minister Mahmoud Abbas: "Stop the bombings and make friends." Corbis photograph by Olivier Coret for In Visu.

—HELEN E. STARKWEATHER

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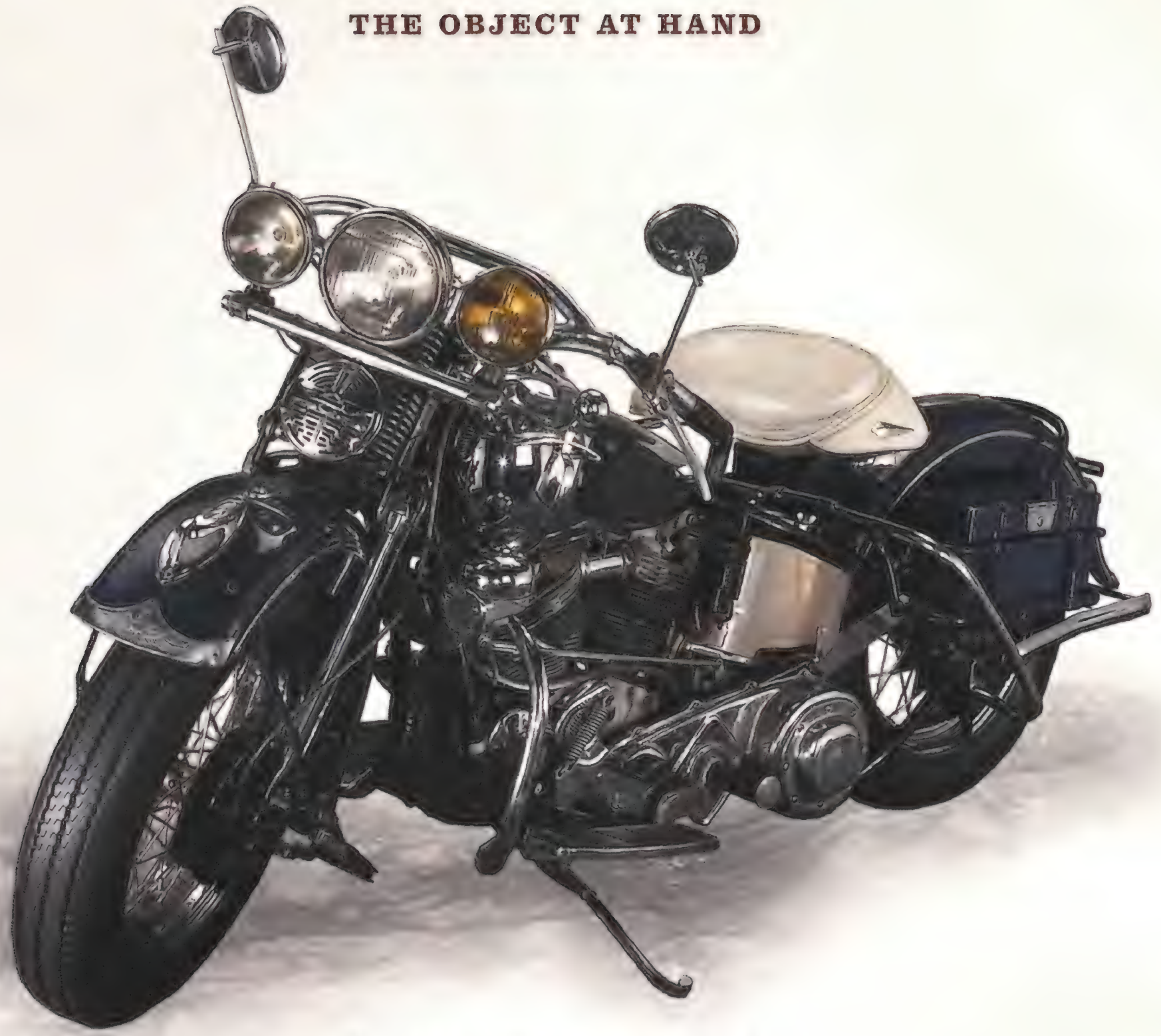

[*1942 Harley-Davidson*]
NATIONAL MUSEUM OF AMERICAN HISTORY

Wild Thing

For 100 years, Harleys have fueled our road-warrior fantasies ~ BY ROBERT F. HOWE

Young woman in a bar to "Johnny," played by Marlon Brando: "What are you rebelling against?" Brando: "Whad'ya got?"

—The Wild One (1954)

Brando as "Johnny"

THE GUYS—AND A FEW WOMEN dressed in tight slacks and tighter sweaters—were just having a little fun. At first. No one quite recalls when things got out of hand. Prodded by boozy dares, bikers raced one another down the main drag. Others spun rubber doughnuts on the pavement, or popped up their front tires and balanced on their back wheels. Water balloons and beer bottles rained down from second-story windows, and just for laughs, a couple of men motored straight into local saloons to the cheers of pleased patrons.

At the end of the day, a *San Francisco Chronicle* account reported breathlessly, Fred A. Earin, chief of the town's seven-man police department, surveyed the damage and had this to say: "It's just one hell of a mess."

That July 4th holiday in 1947 put the farming community of Hollister, California, 40 miles southeast of San Jose, on the map. Newspapers claimed that as many as 60

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were injured, that police needed tear gas to tame the enthusiasts and that a night court had to be convened to process all the arrests. Though in truth, property damage was minimal and no one was badly hurt. "There were a few crazy guys running around, some got to drinking too much," recalls Jess Bravo, 82, then and now a member of the local Top Hatters Motorcycle Club. "There might have been some fistfights, but really, it was nothing serious."

Still, the 1947 media coverage, especially a staged *Life* photograph of a slovenly motorcyclist with beer bottles gathered at his feet, caused a sensation and branded bikers as lawless rebels. Then Hollywood piled on, re-creating its version of Hollister in the 1954 classic *The Wild One*, and following up with dozens of B-grade biker flicks.

"Had Hollister not happened, had *Life* magazine not written their article, had Hollywood not glorified it, I don't know if we would be here today," says Tom Bolfert, head of archives for the Harley-Davidson Motor Company. With or without a cause, the rebel has always been a quintessentially American archetype; all that publicity helped firm up the link between a Wild West ethic and the freedom represented by the motorcycle.

CYCLIST'S HOLIDAY

He and friends terrorize a town

Bikers gone berserk: *Life* magazine's 1947 coverage of the melee in Hollister, California, hyped image of bad-boy cool.

THE HARLEY, as it turns out, has evolved into an American touchstone—which is why the Smithsonian National Museum of American History happens to own Harley-Davidsons of various vintages, four in all (including the 1942 model shown on the previous page). Curator Paul Johnston, who himself commutes to work on a motorcycle, says the Harley-Davidson firm has proved adept at "tapping into nostalgia—it's the bad-boy image."

"We're the oldest, we've survived wars and we've survived depressions," says Willie G. Davidson, grandson of one of the founders and the top design executive at Milwaukee-based Harley-Davidson. Indeed, the finishing touches to the first Harley-Davidson motorcycle were applied precisely 100 years ago, a fact Harley began commemorating last year with an elaborate multimedia touring show. The firm's centennial celebrations will culminate August 28 in Milwaukee with a three-day festival of arts, music, food and, one can only assume, libations. Thousands are then expected to gather August 31 at the city's Veterans Park for one last blowout.

That may conjure up fearful visions of a Hollister repeat. Not likely. The landscape of motorcycling has evolved considerably since Brando roared into town (mounted, by the way, on a British-made Triumph). The typical Harley buyer last year was a man in his 40s; half of the purchasers claimed an annual income of more than $75,000. And while men still dominate the sport, women are saddling up like never before: "In the past you saw the tattooed biker chick almost exclusively on the backseat," says Ann Ferrar, author of *Hear Me Roar*, a 1996 book about women's role in motorcycling. "Now you're seeing women at the controls of their own motorcycles." Last year, Ruth Fredericks, 34, bought a 2003 Harley in San Francisco. "I'd just been through a divorce," says the American Airlines pilot, "so I traded in the husband for the Harley—it's more reliable and more fun."

But for all its success, Harley-Davidson's ride through history has hardly been without a few speed bumps, starting with its modest beginnings. Arthur Davidson and William Harley, amateur inventors who worked at a local sheet metal factory, first strapped a motor onto a bicycle frame in Davidson's basement in 1902 and finished a prototype the following year.

The early models gained traction with consumers because they were practical—and fun. A motorcycle could navigate the rutted dirt roads that often stranded cars, plus outrun and outlast most horse-drawn carriages.

Nowhere was the practicality of motorcycles so quickly understood as in the field of battle. During World War I, Harley and its main competitor, the Indian Motorcycle Company (maker of such models as the Chief and Arrow), furnished cycles to messengers and scouts at the muddy Western Front. Harley got the call again during World War II, producing 90,000 bikes for the United States and its allies.

After the war, plenty of Harley-riding vets came home wanting to cut loose. They formed motorcycle clubs and spent weekends roaring into towns, downing a few beers and then hitting

Hollister's police chief eyed the damage: "It's one hell of a mess."

PHOTO: BARNEY PETERSON / SAN FRANCISCO CHRONICLE; PUBLISHED PAGE: LIFE MAGAZINE, JULY 1947, TIME INC

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Please see important information on the following page.

FLONASE®
(fluticasone propionate)
Nasal Spray, 50 mcg

BRIEF SUMMARY

For Intranasal Use Only. **SHAKE GENTLY BEFORE USE.**

The following is a brief summary only; see full prescribing information for complete product information.

CONTRAINDICATIONS

FLONASE Nasal Spray is contraindicated in patients with a hypersensitivity to any of its ingredients.

WARNINGS

The replacement of a systemic corticosteroid with a topical corticosteroid can be accompanied by signs of adrenal insufficiency, and in addition some patients may experience symptoms of withdrawal, e.g., joint and/or muscular pain, lassitude, and depression. Patients previously treated for prolonged periods with systemic corticosteroids and transferred to topical corticosteroids should be carefully monitored for acute adrenal insufficiency in response to stress. In those patients who have asthma or other clinical conditions requiring long-term systemic corticosteroid treatment, too rapid a decrease in systemic corticosteroids may cause a severe exacerbation of their symptoms.

The concomitant use of intranasal corticosteroids with other inhaled corticosteroids could increase the risk of signs or symptoms of hypercorticism and/or suppression of the hypothalamic-pituitary-adrenal (HPA) axis.

Persons who are using drugs that suppress the immune system are more susceptible to infections than healthy individuals. Chickenpox and measles, for example, can have a more serious or even fatal course in susceptible children or adults using corticosteroids. In children or adults who have not had these diseases or been properly immunized, particular care should be taken to avoid exposure. How the dose, route, and duration of corticosteroid administration affect the risk of developing a disseminated infection is not known. The contribution of the underlying disease and/or prior corticosteroid treatment to the risk is also not known. If exposed to chickenpox, prophylaxis with varicella zoster immune globulin (VZIG) may be indicated. If exposed to measles, prophylaxis with pooled intramuscular immunoglobulin (IG) may be indicated. (See the respective package inserts for complete VZIG and IG prescribing information.) If chickenpox develops, treatment with antiviral agents may be considered.

Avoid spraying in eyes.

PRECAUTIONS

General: Intranasal corticosteroids may cause a reduction in growth velocity when administered to pediatric patients (see PRECAUTIONS: Pediatric Use).

Rarely, immediate hypersensitivity reactions or contact dermatitis may occur after the administration of FLONASE Nasal Spray. Rare instances of wheezing, nasal septum perforation, cataracts, glaucoma, and *increased intraocular pressure have been reported following the intranasal application of corticosteroids*, including fluticasone propionate.

Use of excessive doses of corticosteroids may lead to signs or symptoms of hypercorticism and/or suppression of HPA function.

Although systemic effects have been minimal with recommended doses of FLONASE Nasal Spray, potential risk increases with larger doses. Therefore, larger than recommended doses of FLONASE Nasal Spray should be avoided.

When used at higher than recommended doses or in rare individuals at recommended doses, systemic corticosteroid effects such as hypercorticism and adrenal suppression may appear. If such changes occur, the dosage of FLONASE Nasal Spray should be discontinued slowly consistent with accepted procedures for discontinuing oral corticosteroid therapy.

In clinical studies with fluticasone propionate administered intranasally, the development of localized infections of the nose and pharynx with *Candida albicans* has occurred only rarely. When such an infection develops, it may require treatment with appropriate local therapy and discontinuation of treatment with FLONASE Nasal Spray. Patients using FLONASE Nasal Spray over several months or longer should be examined periodically for evidence of *Candida* infection or other signs of adverse effects on the nasal mucosa.

Intranasal corticosteroids should be used with caution, if at all, in patients with active or quiescent tuberculous infections of the respiratory tract; untreated local or systemic fungal or bacterial infections; systemic viral or parasitic infections; or ocular herpes simplex.

Because of the inhibitory effect of corticosteroids on wound healing, patients who have experienced recent nasal septal ulcers, nasal surgery, or nasal trauma should not use a nasal corticosteroid until healing has occurred.

Information for Patients: Patients being treated with FLONASE Nasal Spray should receive the following information and instructions. This information is intended to aid them in the safe and effective use of this medication. It is not a disclosure of all possible adverse or intended effects.

Patients should be warned to avoid exposure to chickenpox or measles and, if exposed, to consult their physician without delay.

Patients should use FLONASE Nasal Spray at regular intervals for optimal effect. Some patients (12 years of age and older) with seasonal allergic rhinitis may find as-needed use of 200 mcg once daily effective for symptom control (see Clinical Trials section of full prescribing information).

A decrease in nasal symptoms may occur as soon as 12 hours after starting therapy with FLONASE Nasal Spray. Results in several clinical trials indicate statistically significant improvement within the first day or two of treatment; however, the full benefit of FLONASE Nasal Spray may not be achieved until treatment has been administered for several days. The patient should not increase the prescribed dosage but should contact the physician if symptoms do not improve or if the condition worsens.

For the proper use of FLONASE Nasal Spray and to obtain maximum improvement, the patient should read and follow carefully the patient's instructions accompanying the product.

Drug Interactions: In a placebo-controlled, crossover study in 8 healthy volunteers, coadministration of a single dose of orally inhaled fluticasone propionate (1,000 mcg, 5 times the maximum daily intranasal dose) with multiple doses of ketoconazole (200 mg) to steady state resulted in increased mean fluticasone propionate concentrations, a reduction in plasma cortisol AUC, and no effect on urinary excretion of cortisol. This interaction may be due to an inhibition of cytochrome P-450 3A4 by ketoconazole, which is also the route of metabolism of fluticasone propionate. No drug interaction studies have been conducted with FLONASE Nasal Spray; however, care should be exercised when fluticasone propionate is coadministered with long-term ketoconazole and other known cytochrome P450 3A4 inhibitors.

Carcinogenesis, Mutagenesis, Impairment of Fertility: Fluticasone propionate demonstrated no tumorigenic potential in mice at oral doses up to 1,000 mcg/kg (approximately 20 times the maximum recommended daily intranasal dose in adults and approximately 10 times the maximum recommended daily intranasal dose in children on a mcg/m² basis) for 78 weeks or in rats at inhalation doses up to 57 mcg/kg (approximately 2 times the maximum recommended daily intranasal dose in adults and approximately equivalent to the maximum recommended daily intranasal dose in children on a mcg/m² basis) for 104 weeks.

Fluticasone propionate did not induce gene mutation in prokaryotic or eukaryotic cells in vitro. No significant clastogenic effect was seen in cultured human peripheral lymphocytes in vitro or in the mouse micronucleus test.

No evidence of impairment of fertility was observed in reproductive studies conducted in male and female rats at subcutaneous doses up to 50 mcg/kg (approximately 2 times the maximum recommended daily intranasal dose in adults on a mcg/m² basis). Prostate weight was significantly reduced at a subcutaneous dose of 50 mcg/kg.

Pregnancy: *Teratogenic Effects:* Pregnancy Category C. Subcutaneous studies in the mouse and rat at 45 and 100 mcg/kg, respectively (approximately equivalent to and 4 times the maximum recommended daily intranasal dose in adults on a mcg/m² basis, respectively) revealed fetal toxicity characteristic of potent corticosteroid compounds, including embryonic growth retardation, omphalocele, cleft palate, and retarded cranial ossification.

In the rabbit, fetal weight reduction and cleft palate were observed at a subcutaneous dose of 4 mcg/kg (less than the maximum recommended daily intranasal dose in adults on a mcg/m² basis). However, no teratogenic effects were reported at oral doses up to 300 mcg/kg (approximately 25 times the maximum recommended daily intranasal dose in adults on a mcg/m² basis) of fluticasone propionate to the rabbit. No fluticasone propionate was detected in the plasma in this study, consistent with the established low bioavailability following oral administration (see CLINICAL PHARMACOLOGY section of full prescribing information).

Fluticasone propionate crossed the placenta following oral administration of 100 mcg/kg to rats or 300 mcg/kg to rabbits (approximately 4 and 25 times, respectively, the maximum recommended daily intranasal dose in adults on a mcg/m² basis).

There are no adequate and well-controlled studies in pregnant women. Fluticasone propionate should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Experience with oral corticosteroids since their introduction in pharmacologic, as opposed to physiologic, doses suggests that rodents are more prone to teratogenic effects from corticosteroids than humans. In addition, because there is a natural increase in corticosteroid production during pregnancy, most women will require a lower exogenous corticosteroid dose and many will not need corticosteroid treatment during pregnancy.

Nursing Mothers: It is not known whether fluticasone propionate is excreted in human breast milk. *However, other corticosteroids have been detected in human milk. Subcutaneous administration to* lactating rats of 10 mcg/kg of tritiated fluticasone propionate (less than the maximum recommended daily intranasal dose in adults on a mcg/m² basis) resulted in measurable radioactivity in the milk. Since there are no data from controlled trials on the use of intranasal fluticasone propionate by nursing mothers, caution should be exercised when FLONASE Nasal Spray is administered to a nursing woman.

Pediatric Use: Five hundred (500) patients aged 4 to 11 years and 440 patients aged 12 to 17 years were studied in US clinical trials with fluticasone propionate nasal spray. The safety and effectiveness of FLONASE Nasal Spray in children below 4 years of age have not been established.

Controlled clinical studies have shown that intranasal corticosteroids may cause a reduction in growth velocity in pediatric patients. This effect has been observed in the absence of laboratory evidence of HPA axis suppression, suggesting that growth velocity is a more sensitive indicator of systemic corticosteroid exposure in pediatric patients than some commonly used tests of HPA axis function. The long-term effects of this reduction in growth velocity associated with intranasal corticosteroids, including the impact on final adult height, are unknown. The potential for "catch-up" growth following discontinuation of treatment with intranasal corticosteroids has not been adequately studied. The growth of pediatric patients receiving intranasal corticosteriods, including FLONASE Nasal Spray, should be monitored routinely (e.g., via stadiometry). The potential growth effects of prolonged treatment should be weighed against the clinical benefits obtained and the risks/benefits of treatment alternatives. To minimize the systemic effects of intranasal corticosteroids, including FLONASE Nasal Spray, each patient should be titrated to the lowest dose that effectively controls his/her symptoms.

Geriatric Use: A limited number of patients 65 years of age and older (n=129) or 75 years of age and older (n=11) have been treated with FLONASE Nasal Spray in US and non-US clinical trials. While the number of *patients is too small to permit separate analysis of efficacy and safety, the adverse reactions* reported in this population were similar to those reported by younger patients.

ADVERSE REACTIONS

In controlled US studies, more than 3,300 patients with seasonal allergic, perennial allergic, or perennial nonallergic rhinitis received treatment with intranasal fluticasone propionate. In general, adverse reactions in clinical studies have been primarily associated with irritation of the nasal mucous membranes, and the adverse reactions were reported with approximately the same frequency by patients treated with the vehicle itself. The complaints did not usually interfere with treatment. Less than 2% of patients in clinical trials discontinued because of adverse events; this rate was similar for vehicle placebo and active comparators.

Systemic corticosteroid side effects were not reported during controlled clinical studies up to 6 months' duration with FLONASE Nasal Spray. If recommended doses are exceeded, however, or if individuals are particularly sensitive or taking FLONASE Nasal Spray in conjunction with administration of other corticosteroids, symptoms of hypercorticism, e.g., Cushing syndrome, could occur.

The following incidence of common adverse reactions (>3%, where incidence in fluticasone propionate-treated subjects exceeded placebo) is based upon 7 controlled clinical trials in which 536 patients (57 girls and 108 boys aged 4 to 11 years, 137 female and 234 male adolescents and adults) were treated with FLONASE Nasal Spray 200 mcg once daily over 2 to 4 weeks and 2 controlled clinical trials in which 246 patients (119 female and 127 male adolescents and adults) were treated with FLONASE Nasal Spray 200 mcg once daily over 6 months. Also included in the table are adverse events from 2 studies in which 167 children (45 girls and 122 boys aged 4 to 11 years) were treated with FLONASE Nasal Spray 100 mcg once daily for 2 to 4 weeks.

Overall Adverse Experiences With >3% Incidence on Fluticasone Propionate in Controlled Clinical Trials With FLONASE Nasal Spray in Patients ≥ 4 Years With Seasonal or Perennial Allergic Rhinitis

Adverse Experience	Vehicle Placebo (n=758) %	FLONASE 100 mcg Once Daily (n=167) %	FLONASE 200 mcg Once Daily (n=782) %
Headache	14.6	6.6	16.1
Pharyngitis	7.2	6.0	7.8
Epistaxis	5.4	6.0	6.9
Nasal burning/ nasal irritation	2.6	2.4	3.2
Nausea/vomiting	2.0	4.8	2.6
Asthma symptoms	2.9	7.2	3.3
Cough	2.8	3.6	3.8

Other adverse events that occurred in ≥3% but ≤1% of patients and that were more common with fluticasone propionate (with uncertain relationship to treatment) included: blood in nasal mucus, runny nose, abdominal pain, diarrhea, fever, flu-like symptoms, aches and pains, dizziness, bronchitis.

Observed During Clinical Practice: In addition to adverse events reported from clinical trials, the following events have been identified during postapproval use of fluticasone propionate in clinical practice. Because they are reported voluntarily from a population of unknown size, estimates of frequency cannot be made. These events have been chosen for inclusion due to either their seriousness, frequency of reporting, or causal connection to fluticasone propionate or a combination of these factors.

General: Hypersensitivity reactions, including angioedema, skin rash, edema of the face and tongue, pruritus, urticaria, bronchospasm, wheezing, dyspnea, and anaphylaxis/anaphylactoid reactions, which in rare instances were severe.

Ear, Nose, and Throat: Alteration or loss of sense of taste and/or smell and, rarely, nasal septal perforation, nasal ulcer, sore throat, throat irritation and dryness, cough, hoarseness, and voice changes.

Eye: Dryness and irritation, conjunctivitis, blurred vision, glaucoma, increased intraocular pressure, and cataracts.

Cases of growth suppression have been reported for intranasal corticosteroids, including FLONASE (see PRECAUTIONS: Pediatric Use).

OVERDOSAGE

Chronic overdosage may result in signs/symptoms of hypercorticism (see PRECAUTIONS). Intranasal administration of 2 mg (10 times the recommended dose) of fluticasone propionate twice daily for 7 days to healthy human volunteers was well tolerated. Single oral doses up to 16 mg have been studied in human volunteers with no acute toxic effects reported. Repeat oral doses up to 80 mg daily for 10 days in volunteers and repeat oral doses up to 10 mg daily for 14 days in patients were well tolerated. Adverse reactions were of mild or moderate severity, and incidences were similar in active and placebo treatment groups. Acute overdosage with this dosage form is unlikely since 1 bottle of FLONASE Nasal Spray contains approximately 8 mg of fluticasone propionate.

The oral and subcutaneous median lethal doses in mice and rats were >1,000 mg/kg (>20,000 and >41,000 times, respectively, the maximum recommended daily intranasal dose in adults and >10,000 and >20,000 times, respectively, the maximum recommended daily intranasal dose in children on a mg/m² basis).

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the highway. No one thought that much about it until Hollister.

The rise of such rabble-rousing groups as the Hell's Angels, who embraced Harleys from their early days in the 1940s, gave further currency to the rebel cliché. Ralph "Sonny" Barger, a founder of the Oakland chapter, claims that Angel modifications, such as moving the foot brake to the middle of the bike and increasing the horsepower, were quickly appropriated by the manufacturer. "When the rubber meets the road," Barger boasted in his 2001 autobiography, *Hell's Angel*, "the yuppies and the RUBbers (rich urban bikers) will want what we want."

But Harley lost ground in the 1960s and '70s when the Japanese—Honda, Kawasaki, Suzuki—invaded, flooding the U.S. market with less expensive, lighter and faster bikes. In 1969, manufacturing giant American Machine and Foundry bought the company and invested millions in retooling a plant. By the late 1970s, however, AMF had lost patience waiting for a turnaround; when 13 employees, including Willie G. Davidson, scraped up enough money—$80 million—to buy back the company in 1981, AMF was happy to oblige. "My decision was more emotional than financial," says Davidson. "If there was a chance to save this great institution, I wanted to be a part of it."

Harley cut costs and revved up sales; by the mid-1980s, the firm was cruising again. Today, even people who find motorcycling repellent know a Harley when they see one—or rather, hear one.

Of all its distinctive characteristics none is more familiar than the *po-ta-to, po-ta-to, po-ta-to* sound of the idling engine. That's not by accident. It is the carefully engineered result of a design in which the pistons fire unevenly. The company could change it, but the emotional attachment is far too strong. "Not only can you hear it," says Bolfert, "you can feel it. It has a primal sound, like a heartbeat." And the beat goes on. ○

ROBERT F. HOWE is a freelance writer based in Occidental, California.

Noguchi Threw Pottery Askew

By breaking the rules, the modernist artist set himself—and Japanese ceramics—free

JULIAN RABY is a gray-topped, British-accented art historian who was a professor of Islamic Art at Oxford University before becoming director of the Freer and Sackler galleries in May 2002. This spring, Raby was master of ceremonies at the opening for an exhibition of modernist icon Isamu Noguchi's little-known work in ceramic art. It is the first of many shows, Raby said, that fit into a "new spirit and a new direction" at the galleries—"a gathering emphasis on modern and contemporary art."

Noguchi is a clever place to start. An international art figure in the 1930s and '40s, Noguchi was born in 1904 in the United States to a Japanese father and an American mother. He was known for abstract sculpture and public plazas, such as the Garden of Peace at the UNESCO headquarters in Paris. Most often, he worked in granite, slate and bronze. Today, knockoffs of his biomorphic tables and paper lamps abound. (Noguchi died in 1988.)

In 1931, 1950 and 1952, the artist traveled to Japan, where he worked in ceramics: "my close embrace of the earth," he called it. There, he broke almost every rule of the strict tradition. Japanese potters served long apprenticeships and produced bowls, cups, plates, vases and other utilitarian vessels of exquisite craftsmanship. Noguchi took ceramics off the wheel—literally, by hand-building most of his pieces instead of throwing them. He used the

For Noguchi (above, c. 1952), creating ceramics in Japan was "a seeking after identity." The results, pieces like *Work* (top) and *Journey* (right), combined his Asian and American heritages.

PRIVATE COLLECTION / FREER GALLERY OF ART, SMITHSONIAN INSTITUTION; ISAMU NOGUCHI FOUNDATION, NEW YORK; SETO CITY, JAPAN

"wrong" glazes. And he was particularly fond of the useless: a totem pole of centipedes; a fanged mouth with appendages titled *Tiger*; abstractions such as *Journey*, an hourglass shape with two legs on top; and *Work*, a square face mouthing a cigarette stub.

Noguchi also inspired some of the Japanese potters he met. The exhibition features their work as well, including what curator Louise A. Cort calls the most important piece of Japanese ceramics in the second half of the 20th century—Yagi Kazuo's 1954 *Mr. Samsa's Walk*, which looks like a wheel with legs. (The title refers to Gregor Samsa, the main character in Franz Kafka's *The Metamorphosis*.) "It's the culmination of the Japanese potters breaking away from traditional forms, traditional decorations and traditional methods," says Cort.

Noguchi's art, says Raby, was the result of his lifelong struggle to reconcile his Japanese and American backgrounds. "He is always looking obliquely at his two heritages," Raby says. In that spirit, the museum director has coined a word to describe the show and the galleries' new direction: "askewness." —*LORRAINE ADAMS*

"Isamu Noguchi and Modern Japanese Ceramics" is on view in the Arthur M. Sackler Gallery through September 7.

Yagi Kazuo's *Mr. Samsa's Walk* (above) was a breakthrough for the Japanese artists who, inspired by Noguchi, decided to put aside the traditional potter's wheel.

FROM THE ATTIC

WISE OLD OWL "The guards," ordered Smithsonian secretary Alexander Wetmore in the late 1940s, "must remain dauntless to any and all attacks." Wetmore was not bracing his staff for postwar air strikes but for the bombardment of swooping barn owls that nested in the towers of the Castle on the National Mall. Owls had roosted there since the 1860s. Wetmore, an eminent ornithologist who discovered 77 new bird species in his three-decade Smithsonian career, often found time to climb up the dusty ladders into the spires to observe a female incubating her eggs, or to collect the birds' regurgitated pellets of animal remains for later examination. In 1947 (above), he even led National Audubon Society members up to count the owls for their annual national bird census. But in the 1950s, after Wetmore left office, the "business managers," as he called them, nailed up metal sheeting to block the birds' entry. "The owls weren't tidy," Wetmore later recalled, "and so one day they just sanitized everything." In 1974, however, another ornithologist was secretary—S. Dillon Ripley—and he invited the retired 86-year-old Wetmore to tear down the sheeting and install a pair of barn owls from the National Zoo: Alex, named for Wetmore, and Athena. To help the birds settle in, workers fed them dead rats at a rate of 16 a day, but eventually the owls flew away. Since then, the barn owl has proved to be a rare bird around the Castle. —*BETH PY-LIEBERMAN*

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Raccoons' Island Idyll Ends

Once considered threatened natives of the West Indies, raccoons turn out to be tourists

THESE RACCOONS are clever—so clever that for the past hundred years they've fooled scientists into thinking they are native to Guadeloupe, Barbados and the Bahamas. It turns out, according to just-published research by National Museum of Natural History mammalogist Don Wilson, that the island animals are descended from garden-variety American raccoons probably brought over as pets.

A century ago, researchers decided that the island raccoons represented three new, distinct species. Over the years, the animals struggled to survive; all three "species" eventually earned places in the conservationists' bible, the "Red List" of threatened species published by the International Union for Conservation of Nature and Natural Resources (IUCN). On Guadeloupe and the Bahamas, the raccoons are still classified as endangered; the Barbados variety is considered extinct.

But some scientists had long doubted that the critters were truly native to the West Indies; it's unlikely that a nonflying North American mammal could have found its way to the islands millions of years ago and established itself there. So when, in 2000, Harvard undergraduate Kristofer Helgen proposed to settle the matter once and for all, Wilson teamed up with him. For a year, in museums around the United States and in London, the two scrutinized skins and skulls of raccoons from North America and the islands. They concluded that the West Indian and North American specimens all belonged to the same species. The original researchers, says Wilson, probably didn't look at enough specimens and may have mistaken juveniles for small adults.

If IUCN specialists buy Wilson and Helgen's findings, the three "species" could be struck from the Red List as early as this fall. Wilson advocates eliminating raccoons from the West Indies, where they can prey on truly indigenous wildlife, such as the ground-nesting Bahamas parrot.

A Bahamas Parliament proposal to control or eradicate the invaders has stirred little opposition. But the residents of Guadeloupe are partial to their raccoons, which they've officially protected since the 1950s; the animal has even become a symbol of the islands. Wilfrid Demonio, the communications director of the Guadeloupe National Park, says it doesn't matter that the creature is an interloper: "We've adopted it and are proud of it." —*LUBA VANGELOVA*

Despite the raccoon's new status as an invader on the islands, an official from Guadeloupe's national park says, "We've adopted it and we are proud of it."

WHO'S COUNTING?

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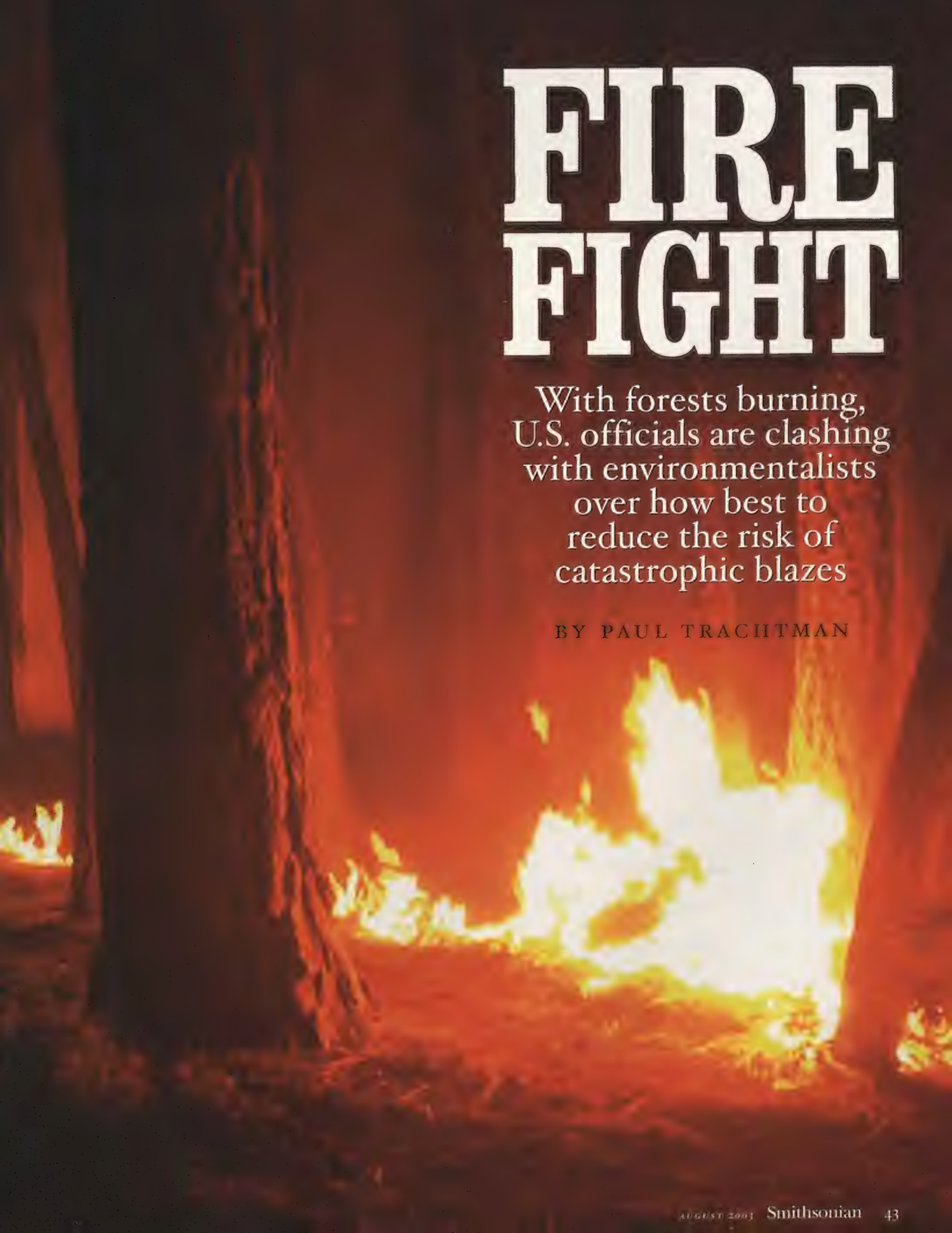
Smithsonian
AUGUST 2007 VOLUME 38, NUMBER 5

Decades of fire suppression have left the West so choked with deadwood, says one forester, that it's like "we've spilled millions of gallons of gasoline in the forests." Catastrophic fires are on the rise; the Rodeo Fire (above) raged across eastern Arizona in 2002.

FIRE FIGHT

With forests burning, U.S. officials are clashing with environmentalists over how best to reduce the risk of catastrophic blazes

BY PAUL TRACHTMAN



KATE KLEIN PARKS her U.S. Forest Service pickup truck along a muddy dirt road and climbs up a steep, rocky outcrop through a ghostly stand of burned ponderosa pines. Her boots sink into soot and ash. It is spring in the Apache-Sitgreaves National Forests in eastern Arizona and new grasses and seedlings should be turning the earth green. But from the top of the hill, she looks out over black trees as far as the eye can see, the remains of one of the largest wildfires in Arizona's history.

Klein, a 49-year-old district ranger with the Forest Service, had spent the better part of a decade trying to prevent a fire here (about 130 miles north of Tucson's June 2003 Aspen Fire, the first major blaze of the season) or at least minimize its effects. The 616,000 acres of the Black Mesa District under her care had long been a powder keg, she says, "a disaster waiting to happen," with too many trees per acre, too much deadwood littering the ground and everything made incendiary by years of drought. She came to believe that the only way to avoid catastrophic fires was to thin the forests through commercial logging, a process that would reduce what foresters call the "fuel load" and slow a fire's spread, giving firefighters a better chance of stopping it.

From 1996 to 1999, Klein and her staff studied the likely impact of logging on a 28,000-acre tract about six miles southwest of Heber-Overgaard, a mountain community of nearly 3,000 people. They had warned that a big fire could roar out of the forest and threaten Heber-Overgaard and nearby communities, places where more and more vacationers and retirees have built homes. "But when we talked to these people about thinning," she recalls, "most of them opposed it, because they moved here for the forest."

If local resistance surprised her, it was nothing compared with the battles to come. In September 1999, having developed a plan to log a third of the tract, Klein's staff filed an 81-page report—required by U.S. regulations—outlining the possible environmental impacts. Environmentalists pounced. Lawyers for the Tucson-based Center for Biological Diversity, nicknamed nature's legal eagles, and two other nonprofit environmental groups said the study had insufficiently evaluated the effects on the environment and such wildlife as the Mexican spotted owl. They challenged the Forest Service computer model that suggested that the northern goshawk's habitat would actually be improved. They protested the harvest of large trees. The center barraged Klein with questions about logging trees infested with a parasitic plant called dwarf mistletoe: "What are the levels of infection in these stands? Have past harvests designed to stop dwarf mistletoe worked? Has the Forest Service monitored any such sales? Why is such a heavy-handed approach being used?" The environmental groups appealed to regional Forest Service officials to stop the project in November 1999. In February 2000, when the appeal was rejected, they notified the service that they intended to sue to block the project. Foresters continued to ready the forest for logging, marking trees to be cut.

Over the next two years, Klein's staff worked with lawyers on the legal case, responding to more questions and gathering more data. "If we don't write everything down, it's assumed we didn't consider it," she says. "Every time we lose a battle, we have to go back and do more analysis, computer models and evaluations. It's a downward spiral. We're forced to do so much writing that we spend less time in the woods knowing what we're making a decision about."

Until now, Klein had always thought of herself as an environmentalist. She had joined the Peace Corps and served in Honduras after receiving her forestry degree from Penn State in 1976. One of her first Forest Service assignments was at a New Mexico outpost, where she'd been proud to live in a house built by the pioneering forester and conservationist Aldo Leopold, author of the 1949 *A Sand County Almanac*, a bible of the environmental movement.

In mid-June of 2002, Klein prepared her final rebuttals to the complaints of the legal eagles. Meanwhile, the drought extended into its fourth year. "The week before the fire, there were three of us in the office working on our response," she says. "We worked all week and Friday night and Saturday, and we had just completed our report and sent it to the regional office on Monday. A fire broke out on Tuesday, a second fire started on Thursday, and four or five days later the whole area had burned up. Talk about frustration and hopelessness and anger and depression!"

The Tuesday fire had been set by an arsonist on the Fort Apache Indian Reservation, 22 miles from the Black Mesa Ranger Station in Heber-Overgaard. This fire was already burning out of control when, two days later, a hiker lost on the reservation started a fire to signal for help. Soon these two fires, the Rodeo and Chediski, would merge into an inferno.

FORESTS ACROSS THE WEST are primed for catastrophic fire, in part by a government policy put in place after the "Big Blowup," in 1910, a two-day firestorm that incinerated three million acres in Idaho and Montana and killed 85 people. The fire was so ferocious that people in Boston could see the smoke. The U.S. Forest Service, then five years old, decided

Legal challenges from environmental groups over a two-year period stymied the efforts of ranger Kate Klein (opposite, a mile from her station) to thin a forest tract by commercial logging. A catastrophic fire broke out just days after she prepared a final rebuttal.

PP. 42, 43 DAVID SANDERS / ARIZONA DAILY STAR / REUTERS NEWS PICTURE SERVICE; P. 45 DOUGLAS MERRIAM

"If we had done all the thinning we wanted to over the years, we could have kept this fire from exploding," says the Forest Service's Kate Klein. In part, she blames environmentalists.

to put out every fire in its domain, and within three decades the agency had formulated what it called the 10 a.m. policy, directing that fires be extinguished no later than the morning after their discovery. As fire-fighting methods improved through the years, the amount of burned forest and grassland declined from about 30 million acres annually in 1900 to about 5 million in the 1970s.

But the success of fire suppression, combined with public opposition to both commercial logging and preventive tree thinning on federal land, has turned Western forests into pyres, some experts say, with profound ecological effects. The vast ponderosa pine forests of the West evolved with frequent low-intensity ground fires. In some places, land that had as many as 30 or 40 large ponderosa pines scattered across an acre in the early 1900s, in grassy park-like stands, now have 1,000 to 2,000 smaller-diameter trees per acre. These fuel-dense forests are susceptible to destructive crown fires, which burn in the canopy and destroy most trees and seeds.

"It's as if we've spilled millions of gallons of gasoline in these forests," says David Bunnell, the recently retired manager of the Forest Service's Fire Use Program, in Boise, Idaho, which manages most wildland and prescribed fires and coordinates fire-fighting resources in the United States. During the past 15 years, the amount of acreage burned by wildfires has climbed, reversing a decades-long decline. In 2002, almost seven million acres burned—up from four million in 1987—and the federal government spent $1.6 billion and deployed 30,000 firefighters to suppress wildfires. Twenty-three firefighters were killed.

Decades ago, Aldo Leopold prophetically warned that working to keep fire out of the forest would throw nature out of balance and have untoward consequences. "A measure of success in this is all well enough," he wrote in the late 1940s, "but too much safety seems to yield only danger in the long run." Recently, the Forest Service has come around to Leopold's view, but many environmentalists continue to oppose agency plans to remove timber from forests.

Klein, who took over management of the Black Mesa District in 1991, places herself in Leopold's camp. "Over my years here, we've put out hundreds of lightning starts as quickly as we could," she says. The practice protected communities at the time, she adds, but also increased the risk of fire in the long run.

BY NIGHTFALL, June 18, firefighters dispatched to the Fort Apache Indian Reservation believed they might contain the arsonist's blaze. But the Rodeo Fire was burning too hot and too fast. On the morning of June 20, the other blaze—the Chediski Fire—was threatening to jump the Mogollon Rim and attack Heber-Overgaard and other communities. Klein's husband, Duke, a wildlife biologist, and their three children were evacuated from the family home in Heber-Overgaard along with everyone else as the flames closed in. For most of the day, she didn't know where they were.

Firefighters at the Black Mesa Ranger Station hoped to make a stand along a forest road on the rim, but they had only one bulldozer and fewer than 30 people. Klein called her boss and requested more firefighters. "He just said there aren't any; you're not going to get 'em," she recalls. Major fires had hit other states, and about 1,000 firefighters were already working above and below the rim.

The morning of June 22, the Chediski Fire raced 12 miles, jumped the rim and reached the Sitgreaves Forest tract that Klein had targeted for thinning. Returning from a briefing she'd given firefighters in nearby Honda that afternoon, Klein drove through "miles and miles of fire," she recalls, past burned-out houses and a blackened trailer park. "I got back to find it had overrun the town and was threatening the ranger station. It had run six or seven miles in a few hours. Its power awed me. Flames rose a couple of hundred feet in the air. It looked like the fire was boiling up there, and you'd see pieces of trees, branches going up. People were scared. I talked to the crews, and they had gotten into some very hairy situations trying to defend the station. In the evening, the fire died down a little, but around midnight we found out that a whole subdivision was threatened. So those guys went out and started fighting the fire again. They worked all night and kept at it until about noon the next day. We didn't have any replacements."

By the next day, the Rodeo Fire began to merge with the Chediski Fire, becoming one great conflagration, eventually stretching 50 miles across. It was what experts call a "plume-dominated fire," intense enough to generate its own weather, with towering thunderheads and rain that evaporated as it fell.

That night, Klein drove up a canyon and at 2 a.m. reached the head of the blaze, a harmless-looking ground fire just creeping along. But there was nobody she could dispatch to attack it. "I felt totally helpless." That morning, Monday the 24th, the fire made another run, which destroyed more houses. Then, on Tuesday, a team of firefighters arrived: soon there were more than 2,000 firefighters along Highway 260, which runs through Heber-Overgaard. Firefighters subdued part of the inferno with backfires—fires intentionally set to reduce fuel in the path of the oncoming blaze. The rest eventually burned itself out as it ran into patchier, less flammable piñon-juniper country.

Over 20 days, the Rodeo-Chediski Fire burned more than 460,000 acres. About 50,000 people were evacuated and 465 residences destroyed. Klein's house was spared, but many of her friends and neighbors were not so lucky; 15 percent of Heber-Overgaard was destroyed. Ultimately, more than 6,600 firefighters had fought the blaze, aided by 12 air tankers, 26 helicopters, 245 fire engines, 89 bulldozers and 95 water-supply trucks. Suppressing the fire cost about $43 million. It will cost another $42 million or so to do emer-

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PAUL TRACHTMAN, a former science editor at SMITHSONIAN, lives in New Mexico. He wrote about artist James Turrell in May 2003.

"The Forest Service is hijacking important concepts like fuels reduction to disguise traditional timber sales," says environmentalist Brian Segee. "They're turning the forest into a tree farm."

"When economics drives the decisions" in managing America's national forest system, says environmentalist Brian Segee (above), Southwest public lands director of the Tucson-based Center for Biological Diversity, "it ultimately results in environmental degradation."

gency rehabilitation in the forest, such as reseeding to prevent erosion and flooding, and long-term recovery work.

The tragedy still galls Klein. "If we had done all the thinning we wanted to over the years, we could have kept this fire from exploding, and we could have saved the towns it burned through." In a sense, she blames environmental activists. "All those arguments we heard about how 'your timber sale is going to destroy Mexican spotted owl habitat,' 'your timber sale is going to destroy the watershed.' And our timber sale wouldn't have had a fraction of the effect a severe wildfire has. It doesn't scorch the soil, it doesn't remove all the trees, it doesn't burn up all the forage. And then to hear their statements afterward! There was no humility, no acceptance of responsibility, no acknowledgement that we had indeed lost all this habitat that they were concerned about. All they could do was point their finger at us and say it was our fault."

For its part, the group that led the fight against Klein's tree-thinning proposal hasn't changed its thinking. Environmentalists at the Center for Biological Diversity believe that even if the project had gone ahead, it wouldn't have made a difference in halting such a large and destructive fire. "The Forest Service is hijacking important concepts like fuels reduction to disguise traditional timber sales," says Brian Segee, the center's Southwest public lands director. "I walked the ground and looked at the marking of trees, and they are turning the forest into a tree farm. When economics drives the decisions, it ultimately results in ecosystem degradation, and we just keep finding that when we don't resort to the courts, we're ignored."

NOT EVERY FORESTER has embraced the idea of fighting every fire. In 1972, in the Wilderness Area of Montana's Bitterroot National Forest, a handful of Forest Service heretics intentionally let a lightning strike burn—the first time the agency had done that. One of the maverick foresters, Bob Mutch, then a young researcher at the Forest Service Sciences Fire Laboratory, in Missoula, Montana, had had the idea that forest health might actually depend on fire. To be sure, a few foresters had previously argued that forests evolved with fire and were adapted to it, but they had been proverbial voices in the wilderness.

Mutch and the others are now retired, but in the midst of the destructive fire season of 2002—and only six weeks after the Rodeo-Chediski Fire scorched Arizona—they journeyed to the Bitterroot Mountains to assess the experiment they had begun three decades earlier. The Forest

DOUGLAS MERRIAM

Service, whose orthodoxy they once challenged, now wanted their advice on preventing catastrophes from occurring in national forests.

In the Bitterroot Mountains, it's only a short way from Paradise to Hell's Half Acre. The ranger outpost at Paradise, where the veterans initially gathered, is a place of deep silence, sparkling water and tall ponderosa pines. The men were eager to look at "the scene of the crime," as they called it. They hardly looked like rebels. Among them was Bud Moore, in his mid-80s, who had grown up in a family of woodcutters and trappers in these mountains, and was hired as a Forest Service smoke chaser in 1935. There was Bill Worf, just a few years younger, who today is almost blind and last summer hiked the wilderness trail with black glasses and a white cane while someone ahead warned of fallen logs across the path. Orville Daniels, now 68, was the supervisor of the Bitterroot National Forest back in 1970. And there were Bob Mutch and Dave Aldrich, who now looked a bit like members of the Monkey Wrench Gang (as author Edward Abbey called a bunch of radical environmentalists in his 1975 novel of the same name). Aldrich, a muscular 63-year-old, had always looked at fire as the enemy until he joined the group. Mutch, 69, an intellectual and a researcher with a passion for ecology, had once been a smoke jumper, a Forest Service firefighter who parachutes from planes.

The only member of the group still employed at that time by the Forest Service was David Bunnell, 59. He was a firefighter before falling in with the Bitterroot bunch in the 1970s, and he remembers well his first encounter with them. "Renegades! Heretics!" he recalls thinking. "I'm surprised they weren't all fired."

As the group hiked a nine-mile trail from the Paradise guard station to a clearing called Cooper's Flat, every step took them through country they'd once watched burn. They pitched tents and talked late into the night over a campfire, reminiscing, and discussing what their experiment had told them about how best to manage America's national forests.

It was Bud Moore who had ignited their conspiracy. In 1969, he was transferred from Washington, D.C. to Missoula as regional director of what was then called Fire Control and Air Operations. As a Bitterroot native, he knew these woods deeply and sensed that fire was a part of their ecology. "When we were starting this program," he says, "we got tremendous support from the environmental community. The biggest resistance we had was in the Forest Service. We had that big culture of firefighters, and I was one of them."

Worf was one of them also. The idea that fire might belong in the wilderness didn't come easily to him. He'd spent years managing timber sales and fighting fires. In 1964, he landed on a task force in Washington, D.C. that was looking at how the Forest Service could implement the recently passed Wilderness Act, which defined wilderness as a place where "the earth and its community of life are untrammeled by man." Worf says, "They weren't talking about a pretty place to backpack!" He read Leopold, who had proposed that the United States set aside wilderness areas and watch nature without getting in its way. In 1969, Worf took a job as regional director of Recreation, Wilderness and Lands in Missoula, where he and Moore got together and agreed that managing wilderness meant leaving some natural fires alone.

"'We're thinking about a pilot project on fire use in wilderness,'" Daniels recalls Moore telling him in a phone call. "It just flashed through my mind, 'Of course this is what we should do.'" Mutch and Aldrich, who had recently joined Daniels' staff, began making inventories of trees and other vegetation, searching for clues to the history of fire in the forests. They cut into fire scars on ponderosa pine, revealing charred tree rings going back as far as the 1720s, showing that fires had burned there every 10 to 20 years. Those blazes evidently were ground fires that periodically cleared away flammable debris, stimulated regeneration of shrubs and grasses and, in general, did not kill large, healthy trees. "We were trying to re-create in our minds how fires had burned on these lands," Aldrich says, "and then write prescriptions for trying to bring fire back."

Their main concern was to keep wildfires from escaping beyond the wilderness, and they developed criteria for letting a fire burn and provisions for fighting the blaze if things went wrong. Aldrich remembers refining his ideas with Mutch late into many a night at Cooper's Flat. Finally, in August 1972, Daniels and Mutch flew to Washington and presented a plan to the agency's top brass to form what would become the Wilderness Prescribed Natural Fire Program. The plan was approved. Now all they needed was a fire.

The "Big Blowup" of 1910 scorched three million acres in Idaho and Montana (above, a devastated section in Idaho's Coeur d'Alene National Forest) and eventually led to the Forest Service policy of trying to put out every fire by the morning following its discovery.

R. H. MCKAY / USDA FOREST SERVICE

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BRIEF SUMMARY Before prescribing NEXIUM, please see full Prescribing Information. **INDICATIONS AND USAGE** NEXIUM is indicated for the short-term treatment (4 to 8 weeks) in the healing and symptomatic resolution of diagnostically confirmed erosive esophagitis. **CONTRAINDICATIONS** *NEXIUM is contraindicated in patients with known hypersensitivity to any component of the* formulation or to substituted benzimidazoles. **PRECAUTIONS** Symptomatic response to therapy with NEXIUM does not preclude the presence of gastric malignancy. Atrophic gastritis has been noted occasionally in gastric corpus biopsies from patients treated long-term with omeprazole, of which NEXIUM is an enantiomer. **Information for Patients** NEXIUM Delayed-Release Capsules should be taken at least one hour before meals. For patients who have difficulty swallowing capsules, one tablespoon of applesauce can be added to an empty bowl and the NEXIUM Delayed-Release Capsule can be opened, and the pellets carefully emptied onto the applesauce. The pellets should be mixed with the applesauce and then swallowed immediately. The applesauce used should not be hot and should be soft enough to be swallowed without chewing. The pellets should not be chewed or crushed. The pellet/applesauce mixture should not be stored for future use. Antacids may be used while taking NEXIUM. **Drug Interactions** Esomeprazole is extensively metabolized in the liver by CYP2C19 and CYP3A4. *In vitro* and *in vivo* studies have shown that esomeprazole is not likely to inhibit CYPs 1A2, 2A6, 2C9, 2D6, 2E1 and 3A4. No clinically relevant interactions with drugs metabolized by these CYP enzymes would be expected. Drug interaction studies have shown that esomeprazole does not have any *clinically significant interactions with phenytoin, warfarin, quinidine, clarithromycin or amoxicillin. Post-marketing reports of changes in* prothrombin measures have been received among patients on concomitant warfarin and esomeprazole therapy. Increases in INR and prothrombin time may lead to abnormal bleeding and even death. Patients treated with proton pump inhibitors and warfarin concomitantly may need to be monitored for increases in INR and prothrombin time. Esomeprazole may potentially interfere with CYP2C19, the major esomeprazole metabolizing enzyme. Coadministration of esomeprazole 30 mg and diazepam, a CYP2C19 substrate, resulted in a 45% decrease in clearance of diazepam. Increased plasma levels of diazepam were observed 12 hours after dosing and onwards. However, at that time, the plasma levels of diazepam were below the therapeutic interval, and thus this interaction is unlikely to be of clinical relevance. Esomeprazole inhibits gastric acid secretion. Therefore, esomeprazole may interfere with the absorption of drugs where gastric pH is an important determinant of bioavailability (eg, ketoconazole, iron salts and digoxin). Coadministration of oral contraceptives, diazepam, phenytoin, or quinidine did not seem to change the pharmacokinetic profile of esomeprazole. **Carcinogenesis, Mutagenesis, Impairment of Fertility** The carcinogenic potential of esomeprazole was assessed using omeprazole studies. In two 24-month oral carcinogenicity studies in rats, omeprazole at daily doses of 1.7, 3.4, 13.8, 44.0 and 140.8 mg/kg/day (about 0.7 to 57 times the human dose of 20 mg/day expressed on a body surface area basis) produced gastric ECL cell carcinoids in a dose-related manner in both male and female rats; the incidence of this effect was markedly higher in female rats, which had higher blood levels of omeprazole. Gastric carcinoids seldom occur in the untreated rat. In addition, ECL cell hyperplasia was present in all treated groups of both sexes. In one of these studies, female rats were treated with 13.8 mg omeprazole/kg/day *(about 5.6 times the human dose on a body surface area basis) for 1 year, then followed for an additional year without the drug. No carcinoids* were seen in these rats. An increased incidence of treatment-related ECL cell hyperplasia was observed at the end of 1 year (94% treated vs 10% controls). By the second year the difference between treated and control rats was much smaller (46% vs 26%) but still showed more hyperplasia in the treated group. Gastric adenocarcinoma was seen in one rat (2%). No similar tumor was seen in male or female rats treated for 2 years. For this strain of rat no similar tumor has been noted historically, but a finding involving only one tumor is difficult to interpret. A 78-week mouse carcinogenicity study of omeprazole did not show increased tumor occurrence, but the study was not conclusive. Esomeprazole was negative in the Ames mutation test, in the *in vivo* rat bone marrow cell chromosome aberration test, and the *in vivo* mouse micronucleus test. Esomeprazole, however, was positive in the *in vitro* human lymphocyte chromosome aberration test. Omeprazole was positive in the *in vitro* human lymphocyte chromosome aberration test, the *in vivo* mouse bone marrow cell chromosome aberration test, and the *in vivo* mouse micronucleus test. The potential effects of esomeprazole on fertility and reproductive performance were assessed using omeprazole studies. Omeprazole at oral doses up to 138 mg/kg/day in rats (about 56 times the human dose on a body surface area basis) was found to have no effect *on reproductive performance of parental animals.* **Pregnancy** *Teratogenic Effects. Pregnancy Category B—Teratology studies have been* performed in rats at oral doses up to 280 mg/kg/day (about 57 times the human dose on a body surface area basis) and in rabbits at oral doses up to 86 mg/kg/day (about 35 times the human dose on a body surface area basis) and have revealed no evidence of impaired fertility or harm to the fetus due to esomeprazole. There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if clearly needed. Teratology studies conducted with omeprazole in rats at oral doses up to 138 mg/kg/day (about 56 times the human dose on a body surface area basis) and in rabbits at doses up to 69 mg/kg/day (about 56 times the human dose on a body surface area basis) did not disclose any evidence for a teratogenic potential of omeprazole. In rabbits, omeprazole in a dose range of 6.9 to 69.1 mg/kg/day (about 5.5 to 56 times the human dose on a body surface area basis) produced dose-related increases in embryo-lethality, fetal resorptions, and pregnancy disruptions. In rats, dose-related embryo/fetal toxicity and postnatal developmental toxicity were observed in offspring resulting from parents treated with omeprazole at 13.8 to 138.0 mg/kg/day (about 5.6 to 56 times the human doses on a body surface area basis). There are no adequate and well-controlled studies in *pregnant women. Sporadic reports have been received of congenital abnormalities occurring in infants born to women who have received* omeprazole during pregnancy. **Nursing Mothers** The excretion of esomeprazole in milk has not been studied. However, omeprazole concentrations have been measured in breast milk of a woman following oral administration of 20 mg. Because esomeprazole is likely to be excreted in human milk, because of the potential for serious adverse reactions in nursing infants from esomeprazole, and because of the potential for tumorigenicity shown for omeprazole in rat carcinogenicity studies, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother. **Pediatric Use** Safety and effectiveness in pediatric patients have not been established. **Geriatric Use** Of the total number of patients who received NEXIUM in clinical trials, 778 were 65 to 74 years of age and 124 patients were ≥ 75 years of age. No overall differences in safety and efficacy were observed between the elderly and younger individuals, and other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity of some older individuals cannot be ruled out. **ADVERSE REACTIONS** The safety of NEXIUM was evaluated in over 10,000 patients (aged 18-84 years) in clinical trials worldwide including over 7,400 patients in the United States and over 2,600 patients in Europe and Canada. Over 2,900 patients were treated in long-term studies for up to 6-12 months. In general, NEXIUM was well tolerated in both short- and long-term clinical trials. The safety in the treatment of healing of erosive esophagitis was assessed in four randomized comparative clinical trials, which included 1,240 patients on NEXIUM 20 mg, 2,434 patients on NEXIUM 40 mg, and 3,008 patients on omeprazole 20 mg daily. The most frequently occurring adverse events (≥1%) in all three groups was headache (5.5, 5.0, and 3.8, respectively) and diarrhea (no *difference among the three groups). Nausea, flatulence, abdominal pain, constipation, and dry mouth occurred at similar rates among patients* taking NEXIUM or omeprazole. Additional adverse events that were reported as possibly or probably related to NEXIUM with an incidence < 1% are listed below by body system: ***Body as a Whole:*** abdomen enlarged, allergic reaction, asthenia, back pain, chest pain, chest pain substernal, facial edema, peripheral edema, hot flushes, fatigue, fever, flu-like disorder, generalized edema, leg edema, malaise, pain, rigors; ***Cardiovascular:*** flushing, hypertension, tachycardia; ***Endocrine:*** goiter; ***Gastrointestinal:*** bowel irregularity, constipation aggravated, dyspepsia, dysphagia, dysplasia GI, epigastric pain, eructation, esophageal disorder, frequent stools, gastroenteritis, GI hemorrhage, GI symptoms not otherwise specified, hiccup, melena, mouth disorder, pharynx disorder, rectal disorder, serum gastrin increased, tongue disorder, tongue edema, ulcerative stomatitis, vomiting; ***Hearing:*** earache, tinnitus; ***Hematologic:*** anemia, anemia hypochromic, cervical lymphoadenopathy, epistaxis, leukocytosis, leukopenia, thrombo-cytopenia; ***Hepatic:*** bilirubinemia, hepatic function abnormal, SGOT increased, SGPT increased; ***Metabolic/Nutritional:*** glycosuria, hyperuricemia, hyponatremia, increased alkaline phosphatase, thirst, vitamin B12 deficiency, weight increase, weight decrease; ***Musculoskeletal:*** arthralgia, arthritis aggravated, arthropathy, cramps, fibromyalgia syndrome, hernia, polymyalgia rheumatica; ***Nervous System/Psychiatric:*** anorexia, apathy, appetite increased, confusion, depression aggravated, dizziness, hypertonia, nervousness, hypoesthesia, impotence, insomnia, migraine, migraine aggravated, paresthesia, sleep disorder, somnolence, tremor, vertigo, visual field defect; ***Reproductive:*** dysmenorrhea, menstrual disorder, vaginitis; ***Respiratory:*** asthma aggravated, coughing, dyspnea, larynx edema, pharyngitis, rhinitis, sinusitis; ***Skin and Appendages:*** acne, angioedema, dermatitis, pruritus, pruritus ani, rash, rash erythematous, rash maculo-papular, skin inflammation, sweating increased, urticaria; ***Special Senses:*** otitis media, parosmia, taste loss, taste perversion; ***Urogenital:*** abnormal urine, albuminuria, cystitis, dysuria, fungal infection, hematuria, micturition frequency, moniliasis, genital moniliasis, polyuria; ***Visual:*** conjunctivitis, vision abnormal. Endoscopic findings that were reported as adverse events include: duodenitis, esophagitis, esophageal stricture, esophageal ulceration, esophageal varices, gastric ulcer, gastritis, hernia, benign polyps or nodules, Barrett's esophagus, and mucosal discoloration. Postmarketing Reports – There have been spontaneous reports of adverse events with postmarketing use of esomeprazole. These reports have included rare cases of anaphylactic reaction. Other adverse events not observed with NEXIUM, but occurring with omeprazole can be found in the omeprazole package insert, **ADVERSE REACTIONS** section. **OVERDOSAGE** *A single oral dose of esomeprazole at 510 mg/kg (about 103 times the human dose on a* body surface area basis), was lethal to rats. The major signs of acute toxicity were reduced motor activity, changes in respiratory frequency, tremor, ataxia, and intermittent clonic convulsions. There have been some reports of overdosage with esomeprazole. Reports have been received of overdosage with omeprazole in humans. Doses ranged up to 2,400 mg (120 times the usual recommended clinical dose). Manifestations were variable, but included confusion, drowsiness, blurred vision, tachycardia, nausea, diaphoresis, flushing, headache, dry mouth, and other adverse reactions similar to those seen in normal clinical experience (see omeprazole package insert-**ADVERSE REACTIONS**). No specific antidote for esomeprazole is known. Since esomeprazole is extensively protein bound, it is not expected to be removed by dialysis. In the event of overdosage, treatment should be symptomatic and supportive. As with the management of any overdose, the possibility of multiple drug ingestion should be considered. For current information on treatment of any drug overdose, a certified Regional Poison Control Center should be contacted. Telephone numbers are listed in the Physicians' Desk Reference (PDR) or local telephone book.

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They got their first one within days, but it petered out. It took a year of waiting before they got a big one. On August 10, 1973, lightning struck at Fitz Creek, which runs into White Cap Creek just above Paradise. As fire spread over the steep canyon slope along the White Cap, Daniels, Aldrich and Mutch stood by and watched. "Every day was a surprise," Aldrich recalls. "I learned more in a few days watching that fire than I did in the preceding 15 years fighting fire." He expected a much more intense fire. But up in the ponderosa pine forests, carpeted with thick layers of needles, the fire merely crept along. "I was able to step through the fire, or if it was burning intensely, I could run through it," he says. Blue grouse were picking away at the roasted pinecones. Mice and chipmunks scurried about. He saw a bull elk nonchalantly grazing about ten feet from the flames. Mutch noticed a black bear poking along the edges of the fire. Nowhere did they see any animals running scared.

Thirty years ago, foresters (Moore, Mutch, Daniels, Aldrich and Worf at their reunion in the Bitterroot forest last year) promoted the unorthodox idea that some wilderness fires should be allowed to burn, a point of view that the Forest Service later adopted.

PAUL TRACHTMAN

But after five days, serenity gave way to shock. A "spot" of burning debris flew across White Cap Creek and ignited the north-facing slope, which was outside the area of the fire plan. Here, thick stands of highly flammable Douglas fir grew in the shade, surrounded by a heavy buildup of broken branches and other debris. "Dave and I were up at a lookout when we got the call that the fire was across the creek, and we turned around and saw this mushroom cloud," Mutch says. "In 30 minutes the fire had gone from the creek bottom 2,000 feet up to the ridge top, with 100-foot flame lengths, throwing spots everywhere. We just stared at it and said to each other, 'Oh my God, what have we done?'"

Daniels was called out of a public meeting in Missoula and raced back to the Bitterroot. Mutch was dispatched to brief a team of firefighters, some of them his old buddies, who were called in to stop the blaze. The firefighters wanted to put out the fire on both sides of the creek. But Daniels defended his turf. He designated the escaped fire the Snake Creek Fire and insisted that the firefighters leave his Fitz Creek Fire alone.

"They just absolutely thought we were crazy," he says, "but they put out the escaped fire after a week, at the cost of half a million dollars, and we allowed our fire to burn clear into the middle of September, and never had any more trouble with it."

THE UNCHECKED FITZ CREEK FIRE marked a profound change in Forest Service philosophy. Since 1972, says the Forest Service's Bunnell, federal agencies have made more than 4,000 decisions to stay the firefighter's hand, resulting in more than a million acres of public lands "treated" by natural wildland fires. In the Bitterroot Wilderness alone, Daniels and his successors have let more than 500 wildland fires burn freely, with impressive results. The Fitz Creek Fire veterans were amazed by what they saw in 2002. "It was the first time I've ever seen a forest working the way a natural forest should work," Daniels says. "You could see the results of all the old and new fires blended together in a mosaic; everything from old stands of decadent and dead trees where woodpeckers love to nest, to thick patches of young trees providing a home for the snowshoe hare, which in turn is prey to the lynx we're trying to recover. It's probably the way the forest looked before anyone began to influence it."

In 2000, a drought year, when Montana had its worst fire season in nearly a century, the Bitterroot Wilderness turned out to be fire resistant. A lot of fires got started, burning some 60,000 acres, but not one firefighter was needed to put them out. As the new fires kept running into places that had previously been allowed to burn, they stalled and expired for lack of fuels on the ground. "We've gained a lot of knowledge about natural fires in these ecosystems," says Jerry Williams, the Forest Service's director of Fire and Aviation Management, "and a lot of it came about watching wildland fires that we've let burn freely in the Bitterroot Wilderness over the past 30 years."

So far, though, the hands-off approach to fires has been mostly limited to wilderness areas. Other national forest areas are generally so dense and so loaded with debris and fuels that letting a lightning strike burn freely would lead to catastrophe. Foresters say that such areas would benefit from natural fires, but only after undergoing "mechanical treatment"—thinning trees and removing deadwood and other fuels. But when foresters propose such treatments, some environmentalists, who believe they, too, have the forest's best interests in mind, oppose the efforts.

Most Forest Service professionals advocate selling timber from national forests to help thin aging stands and also to defray the costs of noncommercial thinning. But some environmental groups argue that commercial logging does more

to destroy the environment than to restore it, and some, like the Sierra Club, have called for an end to all commercial logging in national forests.

The environmental community's distrust of the Forest Service has deep roots, and veteran foresters acknowledge past mistakes. Retired forester Bill Worf concedes that his generation was slow to accept the spirit, if not the letter, of environmental protection laws, and he even admits to a bit of creative obfuscation in times gone by. "You'd decide what you want to do, and then you would write an environmental impact statement that would support it. And that takes a lot of paper because you'd have to hide a lot of stuff." Environmentalists were particularly angered over the years by clear-cutting, or removing all trees from an area. Indeed, at the same time Daniels was approving fire use in the Bitterroot Wilderness, other parts of the Montana forest were the focus of a national battle over the practice. Mutch, the former forester, remembers that loggers "simply harvested what was there, then went in with bulldozers to put in terraces, and planted ponderosa pine seedlings." The result hardly replaced the complex forest that had been there. "It looked like rice paddy terraces in Southeast Asia," he went on. "It was very harsh treatment of the land. And people said, 'Hell no, that's timber mining!'"

Environmentalists and foresters do agree on one point: that before natural fires can be allowed to burn, homes in a forest fire's potential path (such as this Durango, Colorado, residence located dangerously near the 2002 Valley Fire) must be protected.

BARRY GUTIERREZ / ROCKY MOUNTAIN NEWS

The chief of the Forest Service, Dale Bosworth, says that clear-cutting is a thing of the past: "Most of what we harvest now is for stewardship purposes, habitat improvement for wildlife, restoration of watersheds and fuels reduction. All this shrill screaming about timber harvests is just a distraction from the real issue, which is about getting these fire-adapted ecosystems back into a healthy condition so they will be more resistant to catastrophic wildfires."

CONTROVERSY OVER fire management in national forests was boosted last year with the president's Healthy Forests Initiative, which followed the half-million-acre Biscuit Fire, in Oregon. The proposal, which is still being hammered into final form by the Forest Service and Congress, would let forest managers make some decisions about thinning and timber sales with less of the environmental impact analysis and documentation now required by law, and it would also limit the internal Forest Service appeals process, which some environmental groups have used to challenge decisions. A recently released audit by the General Accounting Office of Congress reports that 59 percent of the Forest Service's hazardous fuels reduction projects that were required to have environmental impact statements were appealed during fiscal years 2001 and 2002.

Political debate over the initiative has largely followed party lines, although a new Republican-sponsored Healthy Forests Restoration Act passed the House on May 21, 2003, with the support of 42 Democrats. For their part, Republican supporters say that the bill reflects the current thinking of Western governors and most foresters.

The National Resources Defense Council, a nonprofit environmental action organization, says the initiative is part of a Bush administration plan "to roll back 30 years of environmental progress." The proposal, the council says in a fund-raising flyer, "gives timber companies the right to cut down your last wild forests." Other environmental groups have called it a plan for "lawless logging" and "corporate giveaways."

Still, there are sprouts of compromise coming up though the ashes of last summer's major fires. Local citizens groups across the West are working with the Forest Service and other agencies, focusing on protecting communities near or within national forests. Everyone agrees that the "wildland-urban interface," where peoples' homes and other structures abut forest lands, is the place to start. "It's the first place you have to defend," says Klein. "But you can't devise all your strategies around the wildland-urban interface." That wouldn't protect watersheds, wildlife, old-growth stands, endangered species habitats, recreation areas and other parts of the fire-prone forest ecosystems out in the backcountry, she says.

The sometimes angry debate over healthy forests legislation rings hollow to Klein and many other foresters in the field. "We've almost gotten ourselves into a situation where nothing but a fire will fix it!" she says. "I think most of us working on the ground are disturbed with where we are, and we don't see an easy way out." She foresees a time when fire is allowed to play a larger role in forests, but not before communities are protected, forests thinned, the load of dead fuels reduced and political considerations tempered by ecological ones. Meanwhile, there will be more infernos, she says: "I think we have to accept that catastrophic wildfires are going to be part of getting back to a natural regime." ○

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Guys and Molls

Bold, garish and steamy cover images from popular pulp-fiction magazines of the 1930s and '40s have made their way from newsstands to museum walls

BY DOUG STEWART

George Rozen's 1933 rendering of secretive crime fighter the Shadow (above) was "the first, and possibly best, pulp painting I've purchased," says collector Robert Lesser. Artist Richard Lillis created "A Straw for the Thirsty" (opposite) for *Private Detective Stories* in 1945. Unlike many pulp artists, he saved his paintings.

A BLONDE IN A RED STRAPLESS GOWN grasps the receiver of an emergency telephone, but her call to the cops has been interrupted. From behind her, a beefy brute with a scar on his cheek clamps a meaty hand over her mouth. His other hand presses a .45-caliber automatic against her neck.

What will become of the blonde beauty? Can the police trace her call in time? And what's a dame doing out alone at night in a red strapless dress anyway? Newsstand passersby who saw this scene—painted by New York artist Rafael de Soto for the July 1946 cover of a pulp-fiction monthly called *New Detective Magazine*—could pick up a copy for pocket change and satisfy their curiosity in a story inside titled "She's Too Dead for Me!"

Pulp-fiction magazines—or the pulps, as everyone called them—were monthly or biweekly collections of stories printed on the cheapest wood-pulp paper that could be run through a press without ripping. Their covers, however, were reproduced in color on more expensive coated stock because the gripping, often steamy artwork sold the magazines.

A good pulp cover told a story in a flash. A handsome flyboy hurtles through the air upside down, his mouth open in a scream, his fist clutching the ring of his parachute's rip cord. Disembodied eyes stare at a furtive man in a pulled-down fedora as he pauses under a streetlight; his hands grip a newspaper with the bloodred headline "BODY FOUND."

"The artists who painted these covers had to catch your eye in the depths of the Depression and make you reach for that last ten cents in your pocket," says pulp-art collector Robert Lesser, referring to the usual cover price. "Bear in mind, a dime was real money back then. For a nickel, you could ride a subway or buy a large hot dog with sauerkraut."

Lesser, 70, a New York City playwright and retired advertising-sign salesman, bought his first original pulp-cover painting in 1972. It was a riveting 1933 portrayal by artist George Rozen of radio and pulp-fiction staple the Shadow

ROBERT LESSER COLLECTION (2)

ROBERT LESSER COLLECTION (2)

A successful pulp artist mixed vivid imagination and masterful technique to create images about as subtle as a gunshot.

(p. 54). Cloaked in black against a vibrant yellow background, the "master of the night" is pictured clawing his way out of a captor's net. Over the next 30 years, Lesser tracked down and acquired many more pulp paintings—some 160 in all. Through the end of August, visitors to the Brooklyn Museum of Art can see 125 of these works in an entertaining new exhibition, "Pulp Art: Vamps, Villains, and Victors from the Robert Lesser Collection."

Descendants of the Victorian penny dreadfuls, the pulps enjoyed their heyday in the 1930s and '40s. Their fans (mostly men) plunked down more than a million dollars a month in small change to follow the adventures of Doc Savage, the Shadow, the Mysterious Wu Fang, G-8 and His Battle Aces, or Captain Satan, King of Detectives. There were science-fiction pulps, crime pulps, aerial-combat pulps, Westerns, jungle adventures and more. Americans were eager for cheap escapist entertainment during the Depression and the war years that followed, and the pulps delivered.

"My dad would buy a pulp magazine," Lesser says, "and my sister and I would know to leave him alone. He'd joined the French Foreign Legion for the next few hours."

Best-selling authors like Edgar Rice Burroughs, Zane Grey, Dashiell Hammett, Raymond Chandler, Erle Stanley Gardner and even 17-year-old Tennessee Williams got their start writing for pulp publishers clustered in midtown Manhattan. But literary writers were far outnumbered by fast-typing hacks who pounded out stories like "Blood on My Doorstep," "Gunsmoke Gulch," "Z is for Zombie" and "Huntress of the Hell-Pack" for a penny or less a word.

If the pay scale was any indication, pulp publishers valued painters more than writers. Pulp artists typically earned $50 to $100 for their 20-by-30-inch cover paintings, which they might finish in a day. A top painter could get $300.

"Sometimes the publishers wanted a particular scene on a cover," says Ernest Chiriacka, 90, who painted hundreds of covers for *Dime Western Magazine* and other pulps in the 1940s. "But otherwise they just wanted something exciting or lurid or bloody that would attract attention." Publishers might even hand their writers an artist's sketch and tell them to cook up a story to go with it. Like other ambitious painters, Chiriacka viewed pulp art as a way to pay his bills and simultaneously hone his craft. Eventually, he landed higher-paying work for "the slicks," glossy family magazines like *Collier's* and *The Saturday Evening Post*. "The pulps were at the very bottom of the business," he says. He signed his pulp paintings "E.C.," if at all. "I was ashamed of them," he confesses.

"Chiriacka's attitude was typical," says Anne Pasternak, guest curator of the Brooklyn exhibition. "The artists, many of whom were trained in the finest art schools in the country, considered this a lowbrow activity. Nonetheless, their job was to make the most startling images they possibly could because there were so many pulp titles on the newsstand, and the competition was tough."

"We were paid while we learned to paint," King of the Pulps Walter Baumhofer once said. His doomed parachutist appeared on a 1940 cover of *Adventure*. Trained as an architect, pulp master Frank R. Paul imagined life on a fictional planet in "Golden City on Titan" (opposite) for *Amazing Stories* in 1941.

Big-name artists like N. C. Wyeth and J. C. Leyendecker occasionally stooped to paint for the pulps, but most pulp artists were anonymous. The best of them managed to make names for themselves within this specialized world: science-fiction painters Frank R. Paul and Hannes Bok; depicters of gangsters and victims in extremis like Norman Saunders and Rafael de Soto; fantasy-adventure artist Virgil Finlay; and a man admired by his fellow pulp artists as the "Dean of Weird Menace Art," John Newton Howitt.

A successful pulp artist mixed vivid imagination and masterful technique to create images about as subtle as a gunshot. Brushstrokes were bold, colors raw and saturated, lighting harsh, backgrounds dark and ominous. In the foreground, often in tight close-up, two or three characters

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Born in the 1950s, author DOUG STEWART *was raised on comic books and* Mad Magazine. *He regrets missing out on the pulps.*

The best covers were "painted nightmares," says pulp aficionado Robert Lesser. "Pulp art is hard whiskey."

Artist N. C. Wyeth turned his hand to the pulps in "Ambushed on the Trail" (above) for *All Around Magazine* in 1916. "Dean of Weird Menace Art" John Newton Howitt's "River of Pain" (opposite), done in 1934 for *Terror Tales*, is the only one of his pulp paintings known to survive. The rest were destroyed.

were frozen in mid-struggle, their anguished or shrieking faces highlighted in garish shades of blue, red, yellow or green. Pulp art, the late cover artist Tom Lovell told an interviewer in 1996, was "a highly colored circus in which everything was pushed to the nth degree."

An all-too-common ingredient in the storytelling formula was a stereotypical villain, whether a demented scientist with bad teeth and thick glasses or a snarling Asian crime lord in a pigtail presiding over a torture chamber. The best covers were "painted nightmares," says Lesser, who still enjoys horror films, good and bad. He's unenthusiastic about the content of most traditional art. "You see a landscape, a pretty woman, a bowl of fruit," he says. Decorative stuff, in his view. "Compared to that, pulp art is hard whiskey."

The hardest-hitting covers (and the highest-paying for the artists who made them) were the Spicies: *Spicy Detective*, *Spicy Mystery*, *Spicy Western Stories*, and so on. Published by a New York City outfit that blithely called itself Culture Productions, the Spicies blurred the line between mainstream fun and sadistic voyeurism. When New York City mayor Fiorello La Guardia passed a newsstand in April 1942 and spotted a *Spicy Mystery* cover that featured a woman in a torn dress tied up in a meat locker and menaced by a butcher, he was incensed. La Guardia, who was a fan of comic strips, declared: "No more damn Spicy pulps in this city." Thereafter, Spicies could be sold in New York only with their covers torn off. Even then, they were kept behind the counter. By the 1950s, the pulps were on their way out, supplanted by paperback novels, comic books and, of course, television.

Few people then imagined original pulp art was worth keeping, let alone exhibiting. Once a cover painting was photographed by the printer, it was put in storage or, more likely, thrown out. The artists themselves rarely saved their work. When Condé Nast bought former pulp publisher Street & Smith in 1961, the new owners put a trove of original pulp paintings (including, it seems, some unsigned works by N. C. Wyeth) out on Madison Avenue with the trash.

"This is a genre of American representational art that has been almost completely destroyed," says Lesser. "Out of 50,000 or 60,000 cover paintings, there are only about 700 today that I can account for." If pulp paintings hadn't been so inherently offensive, they might have fared better. "But people didn't want their mother-in-law to see one of these paintings hanging over their new living room sofa," Lesser says. "This is objectionable art. It's racist, sexist and politically incorrect." But since he has neither a sofa nor a mother-in-law, Lesser has crammed his own two-room apartment to impassability with pulp paintings, along with toy robots and monster-movie figures. Pulp art's scarcity, of course, is part of what makes it so collectible today. An original cover painting by Frank R. Paul or Virgil Finlay, for instance, can fetch $70,000 or more at auction.

Lesser is the proud owner of the woman-in-a-meat-locker painting by H. J. Ward that so infuriated Mayor La Guardia. Although it's included in the Brooklyn exhibition, the museum isn't expecting any public outcry, says Kevin Stayton, the Brooklyn Museum's curator of decorative arts.

"Although this art may have pushed the edge of what was acceptable, it's fairly tame by today's standards," Stayton explains. "Things that were troubling to the public 60 years ago, like scantily clad women, don't really bother us anymore, while things that didn't raise an eyebrow then, like the stereotyping of Asians as evil, cause us tremendous discomfort now."

Contemporary British figurative artist Lucian Freud once wrote, "What do I ask of a painting? I ask it to astonish, disturb, seduce, convince." For those with similar demands, pulp art delivers a satisfying kick. People can debate the aesthetic merits of these overwrought, disquieting, sometimes gruesome works of art, but no one can dispute their creators' mastery of the paintbrush as a blunt instrument. ○

COURTESY OF ROBERT LESSER

ROBERT LESSER COLLECTION

Researcher Frans de Waal shows that apes (and humans) get along better than we thought

BY RICHARD CONNIFF

PHOTOGRAPHS BY FRANS DE WAAL

Rethinking Primate Aggression

ONE AFTERNOON in the 1970s, at a zoo in the Netherlands, a burly, dopey-faced chimpanzee named Nikkie, a veteran of the Holiday on Ice Revue, chased another male named Luit around their compound. Chimpanzee males have five times the upper body strength of a college football player, and roughly the same sense of decorum. So other chimps leaped for safety as the two combatants kicked up clouds of dust. You could hear their screaming at the far end of the zoo. Nikkie and Luit ended up in the bare branches of a dead oak tree, safely separated, panting as they gradually calmed down.

This raucous confrontation fit the conventional thinking of 30 years ago perfectly. In a lingering echo of World War II violence, many biologists saw higher primates, including humans, as natural-born "killer apes," their lives defined largely by competition, territoriality and dominance. But the biologist looking on that afternoon at the Arnhem zoo, a soft-spoken young Dutchman named Frans de Waal, perceived something different. About ten minutes after the fight, Nikkie, the alpha male in the group, reached out his arm toward Luit, fingers extended, palm upward, in an offering of peace. De Waal snapped a photograph and watched as the two apes descended to the fork of the tree, where they kissed and embraced, then groomed each other.

Most researchers would have consigned that moment to oblivion under some dusty academic category like "post-conflict interaction." Discussing animals in language that hinted of emotion was heresy then. But de Waal described what had happened between Nikkie and Luit with the same word he would have used after a fight between his own brothers: it was a "reconciliation." Moreover, he went on to argue that chimps are champions of reconciliation. If they could seem like "killer apes," it was far more accurate to describe them as natural-born peacemakers. This arresting new view of primate behavior, and de Waal's gift for writing about it gracefully in a series of popular books, have placed him among the leaders of a quiet revolution in our ideas about the animal world and about ourselves. Harvard University biologist E. O. Wilson credits de Waal with "moving the great apes closer to the human level than could have been imagined as recently as two decades ago."

Anthropologist Sarah Blaffer Hrdy, once a skeptic, now calls herself one of de Waal's "biggest fans" and says his description of the tactics primate societies use to stay together "in spite of their dominance-seeking and even murderous tendencies was terribly important, most especially if we want to understand humans." It's a measure of de Waal's influence beyond the scientific community that his book *Chimpanzee Politics* has been singled out as recommended reading in Congress, and his laboratory in Atlanta has been

Having logged thousands of hours observing chimpanzees and other apes, Frans de Waal (above, at his Atlanta field station) argues that primates, including humans and bonobos (opposite), are more cooperative and less ruthless than once thought.

ENRICO FERORELLI

visited (though with unknown effect) by the richest alpha male in the world, Microsoft chairman Bill Gates.

By watching animal groups in captivity for thousands of hours, de Waal helped show just how narrow and misguided the "killer ape" stereotype really was. His research has also helped correct popular misconceptions about what "Darwinian" behavior means, particularly the "selfish gene" idea that we are born ruthless and, except for human culture, would probably stay that way.

De Waal has argued, on the contrary, that morality is a part of our innate biological heritage. In his 1996 book, *Good Natured*, he didn't quite say that we are born to be good, merely that being good—being cooperative and conciliatory—is the likeliest way to thrive in a social group, whether it's a bridge club, a stock brokerage house or a chimpanzee troop. According to de Waal, chimps, like humans, live by a highly developed set of social rules. They display a keen sense of fairness in their daily give-and-take, an appetite for punishing individuals who misbehave, empathy for victims of injustice, an interest in peacemaking after conflict and, above all, an abiding concern with the maintenance of good relations in the community. De Waal believes this is the rudimentary basis for morality, which may thus date back more than five million years, to the time when chimpanzees and humans shared a common ape ancestor.

As if heeding Theodore Roosevelt's advice to "walk softly and carry a big stick," Arnhem zoo chimp Nikkie asserts his alpha male dominance by walking upright with branch in hand and hair on end, making himself look bigger than his same-sized subordinate.

Other researchers have since found forms of reconciliation in far more distantly related species, from hyenas to fish. Moreover, when neuroscientists have conducted imaging studies on human subjects, they have found that moral questions light up some of the most primitive emotion centers of the brain. "Morality is not a superficial thing that we added on very late in our evolution," de Waal says. "It relates to very old affectionate and affiliative tendencies that we have as a species, and that we share with all sorts of animals."

De Waal's latest book, *My Family Album: Thirty Years of Primate Photography* (University of California Press), is a tour through the rich array of community-oriented behaviors he has witnessed among apes and monkeys. It's also an introduction to the individual chimps, bonobos, capuchin monkeys and macaques who taught de Waal to see these behaviors. "I follow their social lives," de Waal writes, "the way people follow soap operas."

As in a good soap opera, chimpanzee life is anything but gentle, and, his interest in peacemaking notwithstanding, that suits de Waal just fine. On this lazy spring afternoon, he sits watching his study animals from a boxy yellow tower beside an open-air compound, part of the Yerkes National Primate Research Center at Emory University in Atlanta, where de Waal is a psychology professor. Below, one chimp strolls past another and deals out a slap that would send a football tackle to the emergency room. A second chimp casually sits on a subordinate. Others hurl debris, charge, bluff and displace one another. One chimp lets out an outraged *waaa*! and others join in till the screaming swirls up into a cacophony, then dies away.

De Waal, now 55, going gray at the temples, in round, wire-rimmed glasses and a "Save the Congo" T-shirt, smiles down on the apparent chaos. "Growing up in a family of six boys, I never looked at aggression and conflict as particularly disturbing," he says. "That's maybe a difference I have with people who are always depicting aggression as nasty and negative and bad. I just shrug my shoulders and say, 'Well, it's a little fight. As long as they don't kill each other. . . .' " And killing members of their own troop is something chimpanzees rarely do. Their lives are more like one of those marriages where husband and wife are always squabbling, and always making up.

De Waal got his start in biology as a child wandering the polders, or flooded lowlands, in the Netherlands, and bringing home stickleback fish and dragonfly larvae to raise in jars and buckets. His mother indulged this interest, despite her own aversion to seeing animals in captivity. (She was the child of a pet shop owner and joked that the gene had skipped a generation.) When her fourth son briefly considered studying physics in college, she nudged him toward biology. De Waal wound up studying jackdaws, members of the crow family, which lived around (and sometimes in) his residence. Jackdaws were among the main study animals for de Waal's early hero, Konrad Lorenz, whose book *On Aggression* was one of the most influential biological works of the 1960s.

Like many students then, de Waal wore his hair long, and sported a disreputable-looking fur-fringed jacket, with the result that he flunked a crucial oral exam. The chairman of

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RICHARD CONNIFF is at work on an account of Homo sapiens in the workplace. The photographs are from Frans de Waal's recent book, My Family Album: Thirty Years of Primate Photography.

Indulging their natural curiosity, several chimps gather to check out some berries Nikkie has fished out of an Arnhem moat. The ability to follow another's gaze and zoom in on something new, notes de Waal, is "second nature to us, as it is for many primates."

the panel said, "If you don't have a tie on, what can you expect?" De Waal was furious, but during the next six months preparing for his makeup exam, he got his first chance to do behavioral work with chimpanzees. This time he passed the exam, then threw himself full-time into captive primate studies. Eventually he obtained three different degrees at three different universities in Holland, including a PhD in primatology. He continued his research with chimps at the Arnhem zoo, then spent ten years studying macaques as a staff member at a primate center in Madison, Wisconsin. Since 1991, he has divided his time between research at Yerkes and teaching at Emory.

At Yerkes, the chimpanzee compound for de Waal's main study group, FS1, is an area of dirt and grass half again as large as a basketball court, enclosed by steel walls and fencing. The chimps lounge around on plastic drums, sections of culvert pipe and old tires. Dividing walls angle across the open space, giving the chimps a chance to get away from one another. (The walls, says de Waal, "let subordinates copulate without getting caught by the alpha.") Toys include an old telephone book, which the chimpanzees like to shred as a form of amusement.

It is, de Waal acknowledges, a completely artificial environment. Unlike chimps in the wild, his charges don't spend seven hours a day foraging across their home range, they face no competition from outside groups, there are no immigrants or emigrants, and because of a worldwide surplus of captive chimps, birth control is mandatory. Captivity also reduces the power difference between males and females; females who live together defend one other against male aggression. "But the basic psychology of the chimpanzee and the basic behavioral repertoire are still there," he says.

Captive studies also offer one crucial advantage: "You have control and you can see more," says de Waal. In wild studies, it's often a matter of luck whether you find the animals in the first place, "and it's tricky to see when they have a fight, because they tend to run into the underbrush. So to follow what happens after a fight is almost an impossibility." Students of captives used to say that research in the wild was anecdotal and unscientific; the wild researchers in turn said captive work had nothing to do with how animals really live. But the two sides now often collaborate. "I look at it that we need both," says de Waal.

He points out some of the characters in FS1, his mild Dutch accent rendering Rhett as "Rat" and Peony as "Penny." The alpha male in the group is a bristling middleweight named Bjorn. "He's a very hyped-up mean male who has come to the top, I think, by fighting dirty." Within the group, rival males generally fight by something like Queensberry rules. But not Bjorn: "He makes injuries in the belly, in the scrotum, in the throat, places that are potentially dangerous."

These tactics naturally make Bjorn an unpopular alpha. He faces constant pressure from his closest rival, a larger male named Socko, short for Socrates. Nobody else much likes Bjorn either, and they show it by the pant-grunts with which subordinates acknowledge another chimp's superior status. "Bjorn has to work for his pant-grunts," says de Waal. "Socko gets his for free." As in most human groups, regime change is a tantalizing possibility, and de Waal notes, a little hopefully, that Socko's kid brother Klaus is almost at an age when the two siblings might form a coalition to oust Bjorn from power.

To the newcomer, all this tends to look like an indecipherable tumult of hairy beasts "chaotically charging around uttering ear-piercing screams," in de Waal's words. It is a little startling to see an observation get recorded, via Palm Pilot, as an equation like this:

31 a4 71 ao w, 036.979
82 a4 31 a4 d, 037.461

Translated, this means that Socko (animal 31) trampled or bit (that's an a4, on a scale of antagonistic incidents from zero to six) the subordinate male named Rhett (71), resulting in a win (w), at about 37 minutes into the observation period. Bjorn (82) came charging to the rescue with an attack on Socko, who smacked Bjorn right back with an a4. It's a measure of Bjorn's unpopularity that Rhett responded to this attack by siding with his assailant, Socko, leading to a draw (d). The conflict resolved itself 45 minutes later when Socko began to groom Rhett, with Bjorn promptly joining in. Then Bjorn groomed Socko, with Rhett joining in.

The statistical technique is not that different from taking a football game—more hairy beasts chaotically charging around uttering ear-piercing screams—and logging it into record books as a neat set of numbers. It allows de Waal to sort through the 4,000 or so antagonistic episodes he has recorded over the years to find out how often Bjorn and Socko have fought, how supporting characters shifted loyalties, who won and whether they reconciled. The statistics turn animal-watching into science, providing a database to test theories.

As with sports, you can always argue about what the statistics mean, and some scientists believe de Waal overstates the case for peacemaking. "I think he is not fully aware of the importance of unreconciled aggressive interactions in the wild—or he chooses not to recognize them," says Richard Wrangham, whose book *Demonic Males* uses ape behavior to explore the origins of human violence. When chimps quarrel in the wild, he says, they reconcile less than 13 percent of the time, only about a third as often as de Waal reports in captivity. This may be because the combatants can get away from each other in the wild, or because, for strategic reasons, they choose not to reconcile. But Wrangham promptly adds the conciliatory note that he "totally admires" de Waal for having demonstrated that primate life isn't exclusively about waging war, nor about making peace. "If you know chimps, you know they do both."

Two bonobos share a playful moment, as an adult tickles the belly of an adolescent, who chortles in response. Both ape and human senses of humor, writes de Waal, respond to unexpected actions or behaviors, such as infants chasing adults many times their size.

Indeed, despite the combative nature of academic life, de Waal manages to remain widely liked even among fellow primatologists, possibly because his own behavior is so conciliatory and easygoing. He drives out to the Yerkes field station in an avocado green 1970 Pontiac Catalina, a big boat of a car that he calls "an immigrant type of infatuation." (His other car is a more conventional 2001 Toyota.) He speaks English to his students, French at home, German to colleagues passing through, and Dutch to his chimpanzees. He and his wife, Catherine Marin, who was born in the Loire Valley and teaches French at Georgia Tech, live in a wooded area outside Atlanta. They are both workaholics and made a conscious decision not to have children. But they keep goldfish ponds, birdbaths, hummingbird stations and aquariums around the house. De Waal also bakes bread, and plays Bach and improvised blues on the piano. His upbringing has made him a joker, which he describes as a good survival strategy when you are the fourth son and have no hope of becoming the alpha.

His work has always been distinguished, says *The Naked Ape* author Desmond Morris, by a rare "combination of objectivity and imagination." De Waal knows the names of his chimps, their friends and family, their rivals, their character-

With hibiscus leaves in hand and an appeasing grin on her face, bonobo Loretta restrains Lenore's hand as the infant reaches for the tasty treat from her mother's arms. But because Loretta is subordinate to Lenore's mother, all three will share a hibiscus snack.

istic facial expressions and vocalizations, their quirks of personality. He does not worry about the old rule in Western science against attributing feelings, thoughts or even individuality to mere animals. Rather, he writes of animals and humans sharing a "vast common ground" of behaviors. "Instead of being tied to how we are unlike any animal, human identity should be built around how we are animals that have taken certain capacities a significant step farther."

Back when de Waal started out, the ban on "anthropomorphism" was intended to discourage naively projecting human states of mind onto animals. But the intended objectivity was often an illusion. Scientists were happy to describe two chimps as "rivals," according to de Waal, but balked at the idea that chimps could also sometimes be friends. (The word "affiliative" seemed to come more readily to their lips.) They projected their own interest in aggression onto their study animals. (In fact, it turns out, chimps and most other primates spend only about 5 percent of their day in aggressive encounters.) Worse, says de Waal, the underlying idea of an absolute divide between the behaviors of animals and humans was paralyzing, a kind of "anthropodenial." It turned the animals into robots, "blind actors in a play" that only we understood.

But in real life, animals don't act that way. At the Arnhem zoo, for example, one of de Waal's favorite chimps was a deposed alpha named Yeroen whose blustering shows of dominance no longer impressed because he needed to sit down afterward "with eyes shut, panting heavily." Yeroen was enough of a schemer to play the younger males off one another and hang on as a kingmaker. He allied himself with Nikkie, helping him to become the alpha. In repayment, Nikkie indulged the old fox's sexual forays with females in the group, a privilege the alpha would normally try to preserve for himself. To keep the boss on edge, Yeroen would sometimes side with Nikkie's rival Luit. Yeroen was anything but a blind actor in this drama.

De Waal came to view chimpanzee life mainly as an endless round of challenges, fights, coalition-building and brokering of favors. He had witnessed the treetop reconciliation between Nikkie and Luit, and he had an idea that peacemaking behaviors were essential to hold the group together through all this maneuvering. But the maneuvering still dominated his thinking. "Whole passages of Machiavelli seem to

Seeing another chimp chewing food, a hungry female extends her hand in an unmistakable gesture shared by humans and apes alone. "Even though she is of higher rank, the rules among chimpanzees require her to politely ask for a share," de Waal writes.

be directly applicable to chimpanzee behaviour," he wrote in *Chimpanzee Politics*, an account of his years at Arnhem.

If Machiavelli's *The Prince* had been the first book to frankly describe the power motives and manipulations among the human elite, *Chimpanzee Politics*, published in 1982, was the first to show that these behaviors were embedded in our animal evolution. De Waal wrote that his work at Arnhem had taught him "that the roots of politics are older than humanity." It wasn't a case of projecting human patterns onto chimpanzees: "The reverse is nearer the truth; my knowledge and experience of chimpanzee behaviour has led me to look at humans in another light."

The idea of chimpanzee politics naturally attracted the interest of reporters, who asked questions like "Who do you consider to be the biggest chimpanzee in our present government?" De Waal declined to make such a comparison. "People do it to mock the politicians," he remarked, "but I feel they insult my chimps." On the other hand, politicians themselves have sometimes seen a resemblance.

When he became speaker of the U.S. House of Representatives in 1995, Newt Gingrich placed *Chimpanzee Politics* on his list of recommended reading for incoming Republicans. Gingrich himself proved adept at fierce infighting, but seems not to have paid as much attention to the parts of the book about reconciliation. He eventually had to resign from Congress after the Republicans suffered massive losses in the 1998 elections.

De Waal, by contrast, went on after *Chimpanzee Politics* to emphasize peacemaking. What struck him as he watched his chimpanzees was that serious injuries rarely occurred during fights within the group. Nikkie and Luit, for instance, never exchanged an actual blow during their brawl before Nikkie's gesture of peace in the oak tree; their only physical contact occurred as part of the reconciliation. Likewise, Bjorn may bite in the wrong places, but he never unleashes the deadly force chimpanzee males can deploy against outsiders. When de Waal was starting out, the best explanation for such restraint came from an eminent evolutionary biologist who concluded "with a lot of fancy mathematics" that animals generally don't try to kill one another because if they did, their rivals might kill them. "It was so simplistic and so limiting in perspective," says de Waal. "It didn't talk about animals liking each other or needing each other or living together. It just talked about fear of injury."

De Waal came to believe that his chimps lived according to a loose system of favors given and received, what evolutionary biologists called reciprocal altruism. The idea that primates may have evolved for this sort of altruism also gave de Waal the means to counter one of the most pervasive concepts in modern biology. In his influential 1976 book, *The Selfish Gene*, Oxford evolutionist Richard Dawkins argued that we are little more than a product of our genes and that these genes have survived by being as ruthlessly competitive as Chicago gangsters. This became one of the most misinterpreted ideas of the 1980s and '90s and, like "survival of the fittest" in the age of the robber barons, helped to rationalize an era of flamboyantly selfish misbehavior. In fairness, Dawkins didn't intend it that way. "Let us try to teach generosity and altruism," he wrote, "because we are born selfish."

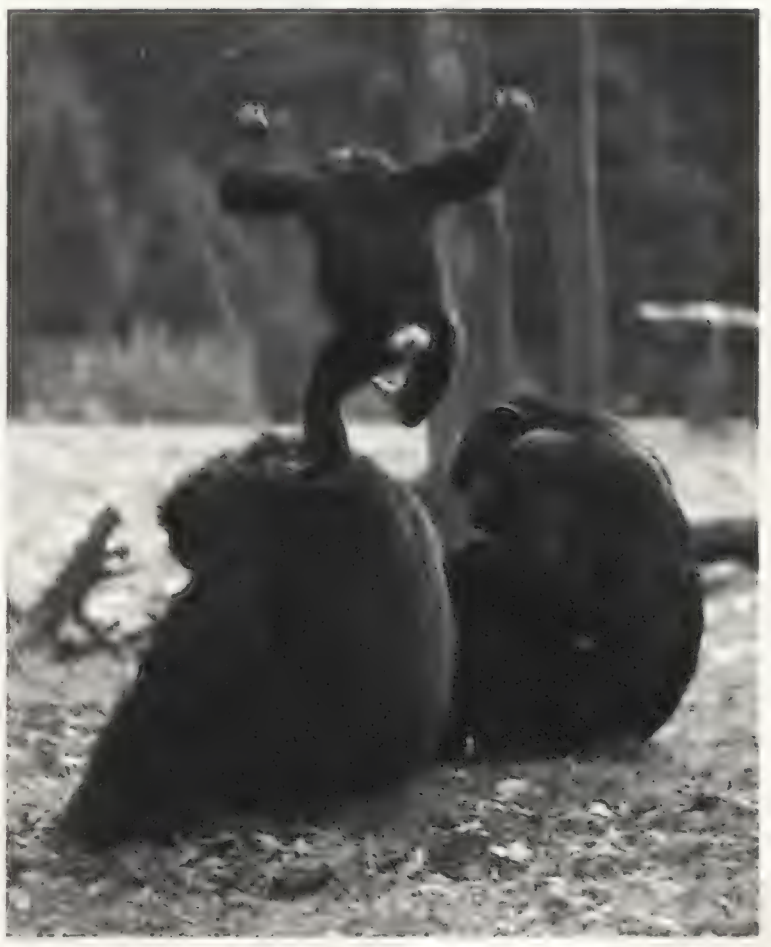
The animal who first made de Waal see the importance of cooperation was a big, lumbering old female chimp named Mama with an "enquiring and all-comprehending" gaze. She once broke up a fight between two warring males by embracing them, one in each arm. Another time she went up to a screaming male and put her finger in his mouth, a gesture of reassurance. Then she turned to his rival and called him over for a kiss, after which the two combatants embraced. "These males are very tense and they're dominant and strong and aggressive," says de Waal. "So to step in and bring them together is a risky business. To me, it means that she cares about relationships in her community. Chimpanzees have something like 'community concern.' They live in a group and they have to get along, and their life is going to be better if their community is better. That's the selfish motive. But this is also the basis of our moral systems: Our life will be better if our community functions better."

Below de Waal's tower at that moment, Bjorn and Socko are embracing like old pals. It is feeding time, and the Yerkes staff often serves a meal in two or three bundles, to study how factors like friendship or rank affect the tricky business of sharing food among the 20 or so chimps in the compound. So the moment is fraught with excitement and anxiety. Much as two humans declare their good intentions with a handshake—a literal clasping of weapon hands—the chimps make obvious gestures of nonaggression. Bjorn is allowing Socko to gnaw on the back of his wrist, and Socko is letting Bjorn mock-bite his shoulder. They slap each other on the back affectionately and dance up and down. Then Bjorn, Socko and Klaus, the three top males, join together in a huddle. It is not quite grace before dinner. But it is not all that different either. The chimps are so intent on defusing the tension of the moment that they completely miss the first round of sugarcane and don't seem to care.

Lest this display of community concern seem a little too rosy, de Waal points out another character in FS1. "Georgia's over here," he says, indicating a 15-year-old female indistinguishable to a newcomer from all the other females. "She's a very mischievous, troublemaking chimp." One of Georgia's favorite tricks as a youngster was to run to the spigot and collect a mouthful of water when she saw visitors arrive at the FS1 compound. Then she would mingle among the other chimps, lips sealed, doing her best to look like a dumb ape, a blind actor. If the unwary visitors eventually came close enough, Georgia gleefully squirted them, to general shrieking and laughter from the other chimpanzees.

Since Darwin first suggested it almost 150 years ago, the human connection to animals, and particularly animals like Georgia, has often seemed like an affront to our dignity. For some religious denominations, it was an assault on the doctrine of human supremacy. But when de Waal talks about the primates he has known, it seems reasonable to take comfort in the connection. Beneath the veneer of civilization, we humans are not necessarily killer apes, nor have we evolved to be as ruthless as Al Capone. We are simply social primates, endlessly working out the business of living together. It is difficult business because, like chimpanzees, we are a quarrelsome species.

A young female chimpanzee enjoys a romp on the back of a tolerant adult male. Among primate societies, writes de Waal, "the youth are like court jesters who in times past could ignore the royal hierarchy and say and do (almost) whatever they wanted."



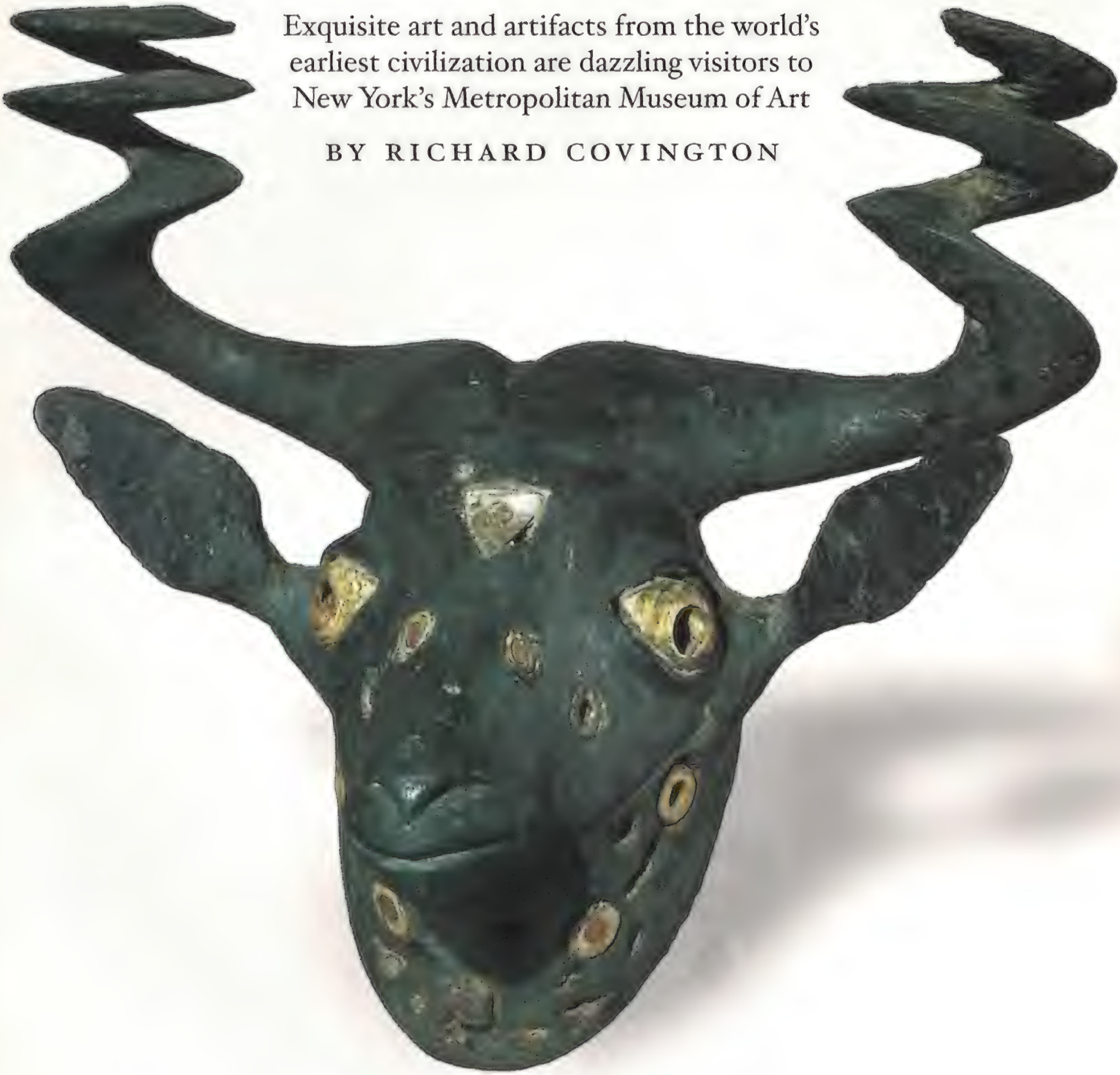
But if de Waal is right, peace may also come to us more naturally than we imagine because of our long evolutionary history of empathy, reconciliation, cooperation and morality.

Even that reprobate Georgia shows signs of reforming. She is a mother now herself and eager to fit into the give-and-take of the community. She has figured out that the man in the yellow tower wields some influence in her world and greets him lavishly, if only for strategic reasons. She no longer spits at guests. She is still not a perfect lady, just a pretty good chimp figuring out how to get along in her world. It is easy to understand why de Waal calls such creatures family. ○

MESOPOTAMIAN MASTERPIECES

Exquisite art and artifacts from the world's earliest civilization are dazzling visitors to New York's Metropolitan Museum of Art

BY RICHARD COVINGTON



The Sumerians of southern Mesopotamia, who founded the first cities, also created extraordinary works of art. The naturalistic c. 2550-2250 B.C. head of a markhor goat (above) might have adorned a temple. The bull's head on the reconstructed *Great Lyre* (far right) from the city of Ur symbolized strength. An inlaid gold vessel in the form of an ostrich egg (right) possibly held food or drink.

AS IRAQ FITFULLY REBUILDS, a groundbreaking exhibition is showcasing that nation's rich roots in Mesopotamia, the region that gave birth to the world's first urban civilization some 5,000 years ago. "Art of the First Cities: The Third Millennium B.C. from the Mediterranean to the Indus" places the land between the Tigris and Euphrates rivers in the center of a vast commercial, religious and cultural network that linked the ancient cities of Ur in southern Iraq, Mari in Syria, Troy in western Turkey and the Indus Valley city of Mohenjo-daro in Pakistan. Originally planned to usher in the third millennium in 2001, this exhaustive and stunning survey of early Bronze Age art may be behind schedule but could hardly be more timely. It is on view at the Metropolitan Museum of Art, in New York City, through August 17.

The exhibition focuses attention on the distinctive style and far-reaching influence of the art created by the Sumerians of lower Mesopotamia, a people who founded the first cities, invented writing, created monumental architecture and developed irrigation, poetry and the rule of law. "People think that a culture dating from the third millennium B.C. must be primitive, which is emphatically not the case," says Metropolitan curator Joan Aruz, who began planning the show five-and-a-half years ago. "It was a very elite society with sophisticated music, art and literature."

With some 400 works culled from 51 museums and private collections in the United States and 15 countries across Europe, the Middle East and Asia, the show traces a trade connection that stretched from Greece to Pakistan and from the

Gulf states to the Caucasus. "What intrigued me most was the chance to demonstrate the extensive trading network that developed to bring both raw materials and finished luxury goods to the royal courts of Mesopotamia and other sites," says Aruz. "No exhibition has ever covered such a broad geographic expanse."

The Sumerians likely bartered palm, fish and vegetable oil, wool and cloth, grain and other agricultural products for such items as gold from Egypt and central Turkey, wood from Iran, and copper and diorite from the Oman Peninsula. Raw blocks of lapis lazuli were transported by foot or donkey from northeastern Afghanistan to Mesopotamian palaces, where artisans fashioned them into sculptures, bowls and jewelry. Sailing across the Arabian Sea, merchants from the Indus Valley converged on the bustling seaport of Dilmun, in present-day Bahrain, with their cargo of ivory combs and carnelian belts and beads to trade with buyers from Ur, 400 miles to the north.

The Metropolitan exhibition opens with a limestone statue of a full-bearded "priest king" believed to be from 3300-3000 B.C. Uruk, a city of some 40,000 inhabitants that was home to the legendary epic hero Gilgamesh. Located 150 miles south of present-day Baghdad, Uruk was once filled with lush gardens, man-made canals and sprawling mud-brick temples. At the Met, subsequent galleries present gold and lapis lazuli jewelry and statuary from the royal cemetery at Ur, which was excavated from 1922 to 1934 by British archaeologist Leonard Woolley. (The city-state of Ur emerged as an important center of commerce and Sumerian culture circa 2700 B.C.) The prize piece is the *Standard of Ur* (below), a trapezoidal box, 18-1/2 inches long by 8 inches high, that depicts battle and banquet scenes in elaborately detailed mosaics composed of shell and lapis lazuli inlay. Because it was found beside the skeleton of a man, Woolley speculated that the box, which dates from the late phase of the Early Dynastic period (circa 2550-2400 B.C.), was carried like a banner, or standard.

Other pieces from Ur's royal tombs include the ornate hammered gold, lapis lazuli and carnelian headdress (opposite) of an Early Dynastic queen named Puabi and a lyre adorned with the golden head of a mythic horned bull sprouting a florid beard of lapis curls. A similar bull-headed lyre, from Puabi's tomb, was damaged in Baghdad's National Museum during looting there in April.

Numerous cuneiform tablets relate tales, such as that of the great flood, that may have inspired stories that appear in the Old Testament. Other myths are represented on inch-high cylinder seals that deliver a visual impact way beyond their size. Relief carvings and elaborate inlay portray ordinary people, kings and, in some instances, the gods and goddesses that were believed to control every aspect of life. In the Mesopotamian world, the gods owned the cities, and humans did their bidding at the behest of kings.

One gallery is devoted to the world's first empire, the Akkadian dynasty, which united Ur, Mari and other cities and flourished from 2300 to 2159 B.C., until it collapsed back into independent city-states. Cylindrical stone seals picture deities in horned headdresses engaged in battle. A mold, perhaps used in the making of a shield, depicts a deified ruler and the goddess Ishtar, invoked in matters of war, love and fertility, along with vanquished prisoners proffering plates of fruit.

Nearly half the pieces in the exhibition illustrate the aesthetic and cultural interchanges among the first cities. The artifacts are presented in a sweeping display, arranged in geographic progression from west to east. Elaborate gold earrings, hairpins and beaded necklaces from Troy resemble aspects of jewelry found in Greece, central Turkey, Mesopotamia and the Indus Valley. A rustic banquet scene incised on a silver cup by

One of the major discoveries from the royal tombs at Ur, an inlaid box (c. 2550-2400 B.C.) called the *Standard of Ur*, was found near a man's shoulder and may have been carried like a banner, or standard. One side (below) depicts a battle; the other portrays a banquet.

TRUSTEES OF THE BRITISH MUSEUM, LONDON; PP. 68,69 UNIVERSITY OF PENNSYLVANIA MUSEUM OF ARCHAEOLOGY AND ANTHROPOLOGY, PHILADE

The floral motif of the gold c. 2550-2400 B.C. headdress of Queen Puabi of Ur (left) likely denoted fertility. The finely carved gypsum head (right) of an unknown king is from c. 2097-1989 B.C. Etched beads (below) have been found across the ancient Near East.

UNIVERSITY OF PENNSYLVANIA MUSEUM OF ARCHAEOLOGY AND ANTHROPOLOGY; ORIENTAL INSTITUTE OF THE UNIVERSITY OF CHICAGO; MUSEE DE LOUVRE, DEPARTEMENT DES ANTIQUITES ORIENTALES, PARIS

a master craftsman from western central Asia echoes the banquet depicted on the *Standard of Ur*.

The final galleries are devoted to Lagash—an independent city-state in southeastern Iraq that reemerged after the fall of the Akkadian empire in 2159 B.C.—and to the Third Dynasty of Ur, which conquered Lagash and other cities around 2080 B.C. Gudea, a pious leader and temple builder who ruled Lagash shortly before its fall, is memorialized as an architect to the gods in a life-size black diorite statue. Nearby, a naturalistically carved gypsum head (circa 2097-1989 B.C.) of an unknown ruler, with its furrowed brow, sunken cheeks and startling eyes, appears to gaze far into the future, evoking an eerily psychological portrait that foreshadows classical Greek sculpture.

Despite the impossibility of borrowing objects from Iraq and Iran because of embargoes, Aruz was able to acquire key works from the British Museum, the Louvre, the University of Pennsylvania and other Western museums. She also tracked down pieces in museums in Turkey, Bahrain, the United Arab Emirates, Saudi Arabia, Pakistan and Uzbekistan.

A single carnelian bead, delicately etched with white circles, which was found on the Greek island of Aigina near Athens, 2,500 miles from its origin in the Indus Valley, provides dramatic evidence of a trading network that linked the Aegean Sea to the Indus Valley. "It was a shock to find it that far west," says Aruz. "Until now, the beads had never turned up west of the royal tombs of Ur."

In another surprise, a three-foot-high figure of a nude man carved around 2500 B.C. on the island of Tarut, in the Arabian Gulf near Bahrain, bears a marked similarity to figures found 600 miles north at Khafajah, near today's Baghdad—an indication of the wide-ranging impact of Mesopotamian sculpture.

"The distressing news about the looting at the National Museum in Baghdad and at archaeological sites throughout Iraq makes this exhibition all the more poignant and relevant," says Mahrukh Tarapor, the Metropolitan's associate director for exhibitions. "We in the Western world need to be reminded that the beginnings of our civilization reach back to the earliest cities in that part of the world. We talk about globalization so glibly today, but there was a large degree of globalization going on in the third millennium B.C." ○

RICHARD COVINGTON writes about art and culture from his home near Paris. His article on Pagan, in Burma, ran in December 2002.

At 22, Jennifer Shahade is the strongest American-born woman chess player ever

BY PAUL HOFFMAN

CHESS QUEEN

ON THE THIRD THURSDAY of this past March, when many art galleries across Manhattan were holding openings, 75 people milled about the Viewing Gallery on West 17th Street, sipping wine, eating cookies and occasionally glancing at the confetti-like landscapes on the walls. A little after 7 p.m., two elegantly dressed young women, one wearing only black and the other all white, from their gloves and their dresses to their flapper wigs, emerged from a unisex rest room and took their places on opposite sides of a chessboard. They planned to play two games, at the brisk pace of 25 minutes a side per game. They shook hands, and the woman in the white wig began by confidently advancing her queen pawn two squares and depressing the chess timer next to the board. The crowd nodded approvingly. "I would not have given up chess," a disheveled man in his 60s said in a stage whisper, "if my opponents had looked like this."

The woman in black was Jennifer Shahade, 22, the 2002 U.S. Women's Champion and the strongest American-born female chess player in history. Her opponent was 19-year-old Irina Krush, who immigrated to the United States from Ukraine in 1988 before she turned 5, the age at which her father taught her the game, and at 14 became the youngest U.S. Women's Champion ever. Although the two chess stars are friends—they were teammates at the 2002 Chess Olympiad, in Bled, Slovenia, and classmates at New York University—

"It's now cool to play chess," says Shahade (left, in black, and above). In March, she and Irina Krush (left, in white) vied at an art gallery benefit for the U.S. Women's Chess Olympiad Team.

"She goes for the jugular immediately," says Shahade's father, Michael (left), a four-time Pennsylvania chess champion. He says that even her internationally ranked older brother, Greg (right), "doesn't take the risks Jen does. By comparison, I play like a real wuss."

they are also fierce competitors, and at the art gallery the gloves came off.

Shahade responded to Krush's queen-pawn opening with a provocative defense known as the Grünfeld, favored by the legendary 1972 world champion, Bobby Fischer, and current world number one, Garry Kasparov of Russia. Black (Shahade) goads White (Krush) into placing pawns in the center of the board, normally an important goal, but Black figures that she can undermine White's center with well-placed blows from the flanks. Here the plan failed because Shahade overlooked the fact that Krush could (and did) win a key center pawn. Later, Krush infiltrated Shahade's position with her knights before launching a decisive mating attack. You could sense Shahade's desperation as she struggled to shelter her king. While she pondered the position, she leaned over the board, and the women's heads almost touched. She cradled her face in her hands—a characteristic posture she shares with Kasparov—and squeezed so hard that her fingers left red marks on her cheeks. She squirmed in her seat and twisted her feet in her black boots. There was no defense, and she resigned on the 42nd move.

"This really sucks," she said to me after she got up from the board. "All your close friends show up to drink wine and enjoy themselves, while you lose in front of them." Twenty minutes later she had composed herself and sat down for the second game. This time she had the advantage of moving first. She advanced her king pawn two squares, a more aggressive opening than Krush had employed in the first game. Shahade needed to win to even the score, and she planned to press Krush from the onset. Krush did not shy away from the battle, and steered the game into what aficionados recognized as an obscure line of the Richter-Rauzer variation of the Sicilian defense. The two players later positioned their kings in opposite corners of the board and launched all-out assaults on each other's monarch.

Krush's attack netted her two pawns, and she could have won immediately by sacrificing a rook, but Shahade set a trap on the 30th move. If Krush misjudged the position and made a seemingly natural choice that offered the exchange of queens, Shahade could win a knight—a decisive material advantage—through four simple moves. At classical tournament chess, where each player can take three hours for a

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PAUL HOFFMAN's latest book is Wings of Madness: Alberto Santos-Dumont and the Invention of Flight.
Photographer SYLVIA PLACHY is based in New York.

SYLVIA PLACHY; PP. 72, 73 MIG GREENGARD; P. 73 BRIAN KILLGREW / U.S. CHESS FEDERATION

"People sometimes ask me if chess is fun," Shahade says. "'Fun' is not the word I'd use. It's stressful, even if you win."

game, Krush would presumably never fall for such a trap, but here, with time running out, it was possible she would go wrong. The strong chess players in the audience, even with wine in them, knew what was happening. "It's Jennifer's only chance," whispered her brother, Greg, two years her senior and a world-class player himself. He turned nervously away from the board, as if staring at it might jinx his sister's subterfuge. Krush fell for the swindle and, unlike her emotional opponent, sat there poker faced as she lost the knight and, subsequently, the game.

It was almost 10 p.m., and the spectators started chanting "tiebreak! tiebreak!"—hoping that the two cerebral gladiators would play a sudden-death blitz game (five minutes a side) to determine the winner. But Krush had a late-night engagement, and Shahade, who was tired and drained, seemed content to call it a tie.

"People sometimes ask me if chess is fun," Shahade told me later. "'Fun' is not the word I'd use. Of course I enjoy it, or I wouldn't play. But tournament chess is not relaxing. It's stressful, even if you win. The game demands total concentration. If your mind wanders for a moment, with one bad move you can throw away everything you've painstakingly built up."

UNTIL THE 19TH CENTURY, women were not welcome in chess clubs in Europe and America. In the mid-1880s, a club in Turin, Italy, allowed the wives and daughters of its members to join them at the chessboard, a practice that was applauded by then-world champion Wilhelm Steinitz. "This is as it should be," Steinitz wrote, "and we hope that this example will be followed by other chess societies, it being evident that, if we engage the queens of our hearts for the queens of our boards and if we can enlist the interest of our connubial mates for our chessical mates, our intellectual pastime will be immensely benefited and will pass into universal favor." But change was slow: when women played in an international tournament for the first time, in London in 1897, a commentator cautioned that they "would come under great strain lifting the leaded, wooden chess sets."

When I played chess in scholastic tournaments in the late 1960s and early '70s, female players were still a rarity, and the flea-infested chess parlors I frequented near New York City's Times Square were a world away from chic art galleries. Even though playing the game well was regarded as a sign of intelligence, chess had an ancillary reputation as the recreation of social misfits. Bobby Fischer was a national hero for wresting the world championship away from our cold war rivals, the Russians, but he was hardly a model of how to lead a balanced life. When a television talk-show host asked him what his interests were besides chess, Fischer seemed puzzled and replied, "What else is there?" In another interview, he said that he wanted to make a lot of money so that he could live in a house shaped like a rook.

Today, three decades later, the game of kings has unmistakably surged in popularity. Writer Martin Amis, comedian Stephen Fry, magician David Blaine, model Carmen Kass, pugilists Lennox Lewis and Wladimir Klitschko, actors Will Smith, Woody Harrelson, Susan Sarandon and Greta Scacchi, even Madonna and Sting, are all "woodpushers." "It's now cool to play chess," said Jennifer Shahade. "The game is finally shedding its image as a magnet for geeks." Shahade herself is a model of cool. Stuffed under the black pageboy wig she wore at the gallery match are flowing brown curls streaked blonde and red. She lives in a loft in the Williamsburg section of Brooklyn, one of the hippest areas of New York City, where Internet cafés and nouveau-Thai restaurants have displaced mustard and girdle factories. She also plays basketball, air hockey and Ms. Pacman.

MICHAEL SHAHADE

Shahade (at age 2 with brother, Greg, age 4) learned to play at age 6 from her father. Greg became a national master when he was 14; his sister claimed that rank at 15.

Chess's popularity extends well beyond the celebrity set. Membership in the 64-year-old United States Chess Federation, the organization that sanctions tournaments and ranks players, has swelled to a record high of 98,700. Colleges such as the University of Maryland, Baltimore County, and the University of Texas at Dallas and at Brownsville now award chess scholarships, and grade schools throughout the country include chess classes in their curricula. In New York City alone, 36,000 children in 160 elementary and junior high schools are learning the fine points of the game from

She showed the students games in which strong women defeated male grandmasters. "Play like girls!" she told the class.

teachers paid by a nonprofit organization called Chess-in-the-Schools. Parents on Manhattan's Upper East Side have been known to pay $200 per hour to hire private chess tutors for their children.

Today more girls than ever before are learning the rules of chess, but male players are still the norm at the highest levels. Of the roughly 1,200 members of the United States Chess Federation who are currently ranked as national masters or higher, only 14, including Shahade and Krush, are women. On the international chess circuit, top-ranked female players are also rare; of the 100 best players in the world, only one is a woman: 27-year-old Judit Polgar of Hungary, who is ranked number ten.

Even if the world of tournament chess is no longer an exclusive male club, there are obstacles for females. For one, world champions have not always put out the welcome mat. Bobby Fischer dismissed female players as "weakies," and Garry Kasparov, in a recent interview in the *London Times,* said that females are not generally capable of excelling at the game. "[Chess is] a mixture of sport, psychological warfare, science and art," he said. "When you look at all these components, man dominates. Every single component of chess belongs to the areas of male domination."

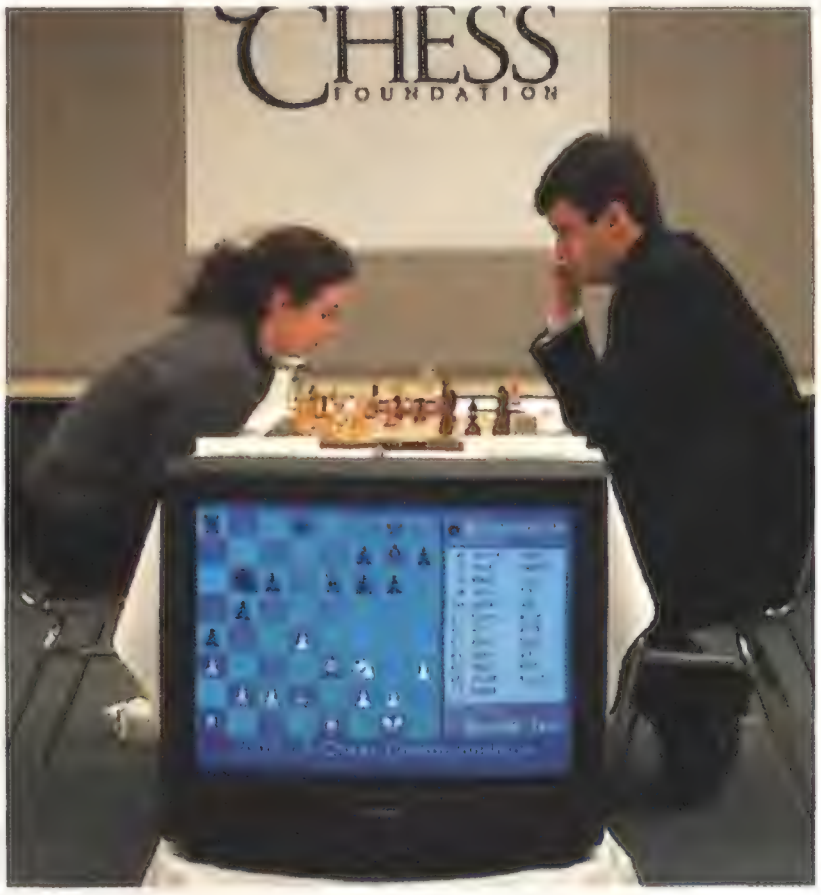
But Kasparov prides himself on being provocative. "You have to laugh," said Shahade. "You don't know whether he really believes what he is saying, or is doing his usual thing of trying to get people riled up. And in a sense, who cares? All I know is that the chess world has accepted and encouraged me. I've never personally experienced any kind of discrimination or roadblock because I was a woman."

Irina Krush feels the same way. "If anything, being a woman is an advantage," she told me. "You get more invitations to exclusive tournaments because you're considered to be something of a novelty. Male players have sometimes claimed that I also have an advantage because they are distracted by how I look. I don't buy that, though. When chess players lose, they always come up with excuses."

"If you find someone attractive," Shahade said, "you don't play worse. You buckle down and try to play better because you want to impress them with your brilliance."

The chief impediment to more women playing tournament chess seems to be cultural. "If you're going to become very good at chess," Shahade told me, "you have to pour yourself into it. In our society, we consider it weird if a boy is obsessed with chess, if he spends the bulk of his waking hours playing and studying the game. Now if a girl does that, it's not just weird, it's downright unacceptable. Women are usually discouraged from pursuing chess and other intellectual activities that require time-consuming devotion. I was fortunate to have a mother who succeeded in the traditionally male field of chemistry. She's a chemistry professor at Drexel University and an avid games player—blackjack, poker, chess. There were periods in my life when chess was the most important thing to me. It's not that I did chess all day—I took time to be with my friends or to exercise—but I justified the time with my friends and the exercise as being good for my chess. Today my life is pretty balanced. I admire Antoaneta Stefanova. She's a Bulgarian grandmaster who is only a couple of years older than me. She's the number two woman player in the world. She's dedicated to the game but also has an active life away from the board. She likes to party and to go out at night between rounds at a tournament."

ON A SUNDAY AFTERNOON early this past January, I joined Shahade in the offices of Chess-in-the-Schools for a program called Girls Academy. Once a month, a couple of dozen girls, ages 9 through 13, come together from across New York City for six hours of intensive instruction from Shahade and Krush. The two champions know that they are role models for girls who dream of reaching the higher echelons of chess.



At the 2002 U.S. Chess Championship, the first in which men and women competed together, Shahade (above, losing to Alexander Stripunsky) took the women's title.

JOHN TERRIEN

Shahade spent the first couple of hours showing the class moves from well-known games that strong women played against each other or, better yet, in which they defeated male grandmasters; her charge to the students was "Play like girls!" She is particularly fond of Judit Polgar's games. The Hungarian's sharp, take-no-prisoners style has claimed the scalps of the world's leading men, including, this past September, Garry Kasparov's—sweet revenge considering that

Shahade's 9- to 13-year-old students are among 36,000 New York City children who take lessons through a nonprofit organization called Chess-in-the-Schools. Chess's popularity is at an all-time high; membership in the U.S. Chess Federation is a record 98,700.

Kasparov had once described Polgar as a "circus puppet." "I love her uncompromising approach," Shahade said. "Just when you think the position is sterile, she stirs up complications by sacrificing a piece and launching a blistering attack. It's awesome."

Shahade favors bold, tactical play herself. She grew up in Philadelphia, where she learned chess at the age of 6 from her father, Michael, a four-time champion of Pennsylvania. She was also inspired by her brother, Greg, who became a national master when he was 14 and six years later earned the prestigious Samford fellowship for the country's most promising chess player under 25. Jennifer's big break came in 1996 at the so-called Insanity Tournament at the venerable Marshall Chess Club in Manhattan's Greenwich Village. "It's a crazy event," she said. "You play, I think, nine games. You play all night with the rounds starting at odd times like 2:11 a.m. and 4:23 a.m. I was about to turn 16 and I managed to get it together and do well with no sleep." She came in first and joined her father and brother as a certified national master.

Of the three, Jennifer is the most aggressive player, something you wouldn't guess from her soft voice and the balletic way she carries herself when she is not huddled over a chessboard. "By comparison, I play like a real wuss," her father told me later. "My style is more positional, accumulating tiny advantages until I win in the endgame. She goes for the jugular immediately and reaches positions that are so complicated they give me a headache to look at. I don't know how she does it. Even Greg, whose play is much sharper than mine, doesn't take the kinds of risks Jen does."

That afternoon at Girls Academy, Shahade shared with her students one of her own disappointments at the chessboard. It is a game from the final round of last year's Olympiad in Bled, where teams from 89 countries competed in the women's division, and the United States was in medal contention until the final rounds. "You can always learn a lot from your losses," she told the students. She set up the key position from her match with Ukrainian Inna Gaponenko and explained what went wrong. "I had a choice of two ways to capture. I could have taken with the pawn or the rook. If I took with the rook, it would lead to a draw. I took with the pawn and quickly lost. Taking with the pawn was a radical misjudgment. Why did I do it? There was probably a psychological reason. Earlier, I thought I had stood better in the game, so I didn't want to settle for a draw and admit that I hadn't been able to press my advantage.

"I also learned from Bled that I didn't have enough stamina," she said to the students, a curious confession from a woman who made her mark in the Insanity Tournament. "I won five of my first six games, but then, sadly, I had a big slump so that I ended up with six wins and five losses. I'm used to American weekend tournaments in which four or five rounds are crammed into two or three days. The Olympiad lasted two weeks. I can play chess 12 hours a day for a weekend on sheer adrenaline and then crash, but I can't sit at the board with peak concentration for days at a time." She told me later that she is running, lifting weights and shooting baskets to build up her stamina. Most of the world's top players have strenuous exercise routines to balance their sedentary chess playing. Bobby Fischer jogged regularly long before it was fashionable to do so, and Garry Kasparov pumps iron, swims and rows as part of his chess training.

Toward the end of the afternoon, Shahade's and Krush's students came together for joint instruction. Krush had set up a position on an oversize demonstration board in front of the room. She asked the girls to study it and then pair off and play the position out, with chess clocks ticking as if this were

SYLVIA PLACHY

"Chess is a zero-sum game that rewards ruthlessness, not cooperation," Shahade says. Yet she is drawn to its intensity.

a tournament. Later the girls would compare their moves with those of the chess titans who had played the original game. Shahade glanced at the demonstration board and, feigning indignation, exclaimed, "That position was never reached by a woman!"

The position that Krush had chosen showed the board after the 16th move of a famous 1895 game between Wilhelm Steinitz and a German master named Curt von Bardeleben. On White's 17th move—which the girls were asked to find—Steinitz boldly sacrificed his queen pawn so that a path would be cleared for his knight to join in the hunt for the Black king. Eight moves later, von Bardeleben was so disgusted with the position of his exposed monarch that he simply disappeared from the Hastings, England, tournament hall and never returned. Steinitz then awed the spectators who had gathered around with an elegant continuation in which he forced checkmate in ten moves.

When Krush showed the class the actual game, the girls marveled at the depth and beauty of Steinitz's mating attack. What Krush didn't tell the students was the fate of the two men. Steinitz eventually went mad, claiming that he had played chess with God over an invisible phone line and beaten him. And von Bardeleben, in 1924, leaped to his death from a window. His self-defenestration was emulated by the most famous fictional chess player, Luzhin, in Vladimir Nabokov's novel *The Defense*.

That chess has a long history of association with obsession and eccentricity is not part of the Chess-in-the-Schools curriculum. When a student in one of Shahade's other classes asked her whatever became of Bobby Fischer, she responded, "Never mind! Let's just appreciate his games!" (A fugitive from American justice because he violated economic sanctions against the former Yugoslavia by playing a 1992 tournament there, Fischer reportedly lives in Japan. He condones the violence of September 11 and rants on talk radio about the "world Jewish conspiracy.")

During a break at Girls Academy, Shahade put aside the remains of a large tossed salad. She had eaten none of the sun-dried tomatoes, which were scattered across the bowl. Krush eyed the salad dregs, and Shahade offered them to her. "Why didn't you eat the tomatoes?" Krush asked. "Are you trying to poison me?"

"You never know," Shahade playfully responded.

"It would be a good trick," said Krush. "I wonder if anyone has ever tried it—making their opponent sick just before an important match."

LATER THAT WEEK, Shahade and Krush joined 56 other chess players in Seattle for the 2003 U.S. Chess Championship. Shahade was the defending women's champion, and Krush wanted a shot at the title, which she had earned once before, in 1998. When Shahade won in 2002, it was the first time women and men had played together in the 157-year-old national tournament. No female player had ever qualified to enter the championship, and in 1937 a separate women's division was created, in which female players competed among themselves for the title of U.S. Women's Champion. In 2002, the women's division was dissolved, though the title remained. Shahade, who did not face any women in the tournament, nonetheless became U.S. Women's Champion by achieving the highest score of all the women. At the players' meeting before the 2002 tournament, some men had complained that the participation of women would degrade the quality of the play, but Shahade proved them wrong. In the very first round, she disposed of Gennady Sagalchik, a Brooklyn-based grandmaster who had been particularly vocal in objecting to the inclusion of women.

"I was delighted to beat Sagalchik, but not because he was being sexist," Shahade said later. "I didn't think he was. I didn't think he was speaking about me—I knew I would give the men a fight, and he probably knew that too—but about some of the other, lower-ranked female players. I was glad to beat him because I had a pattern of reaching good positions against grandmasters, getting nervous, and making inaccurate moves to let them slip away."

Even Shahade is not entirely convinced that having a coed championship is in the best interest of women's chess. While the top-ranked women are strong enough to give the men a good fight, or even beat them, the lower-ranked qualifying women are weaker than the weakest men. "Is it good for a young woman's confidence and chess career if she has a horrible result in the U.S. Championship?" asked Shahade. "Maybe it would be better for her to play in an all-women's event? But I can also argue the reverse—that it is motivating to play in a championship with the country's best players, and that women will get better as a result."

The 2003 tournament was more difficult for her. After a slow start and a seventh-round victory, she found herself tied for first among the women and, therefore, in a good position to retain her title. Her brother was also competing in the championship—the first time since 1969 that siblings had played in the competition at the same time—and he, too, had an important victory in the seventh round.

During the tournament, the two Shahades prepared for their opponents in different ways. Each evening at about 10, they learned whom they would face the next afternoon and whether they were going to have white or black. Before going to bed, Jennifer would turn on her notebook PC and search through a database of more than two million chess games for those played by her opponent. She'd scan the relevant games and make a quick decision as to what sequence of opening moves she thought would give her adversary the most trou-

ble. But she would save the bulk of her study for the morning. "I can sleep better," she told me, "after I select the particular opening. Otherwise, I'll toss and turn and mull over it during the night."

Greg's approach was less disciplined. He routinely went to bed at four in the morning and rose only minutes before the 1:30 p.m. round. He, too, possessed a PC with two million chess games stored on it, but his database apparently got less use than his sister's. He used his laptop to play kung-fu chess—an Internet action game in which multiple chessmen rush forward as fast as you can move them—at which he is the world's number one player. He also kept busy with a Sony Playstation, a TV season's worth of "The Simpsons" on DVD, and a Dance Dance Revolution Pad (an electronic dance mat), all of which he had brought from New York. I happened to occupy the hotel room next to his, and on the night before the final round, when he could have been preparing for one of his toughest opponents—15-year-old Hikaru Nakamura, who a month later would break Bobby Fischer's 1958 record as the youngest American grandmaster—I awoke at 4 a.m. to the sound of Bart Simpson's voice and Greg laughing loudly.

"How's the Nakamura preparation going?" I shouted through the wall.

"Not well," said Greg. "I haven't started yet."

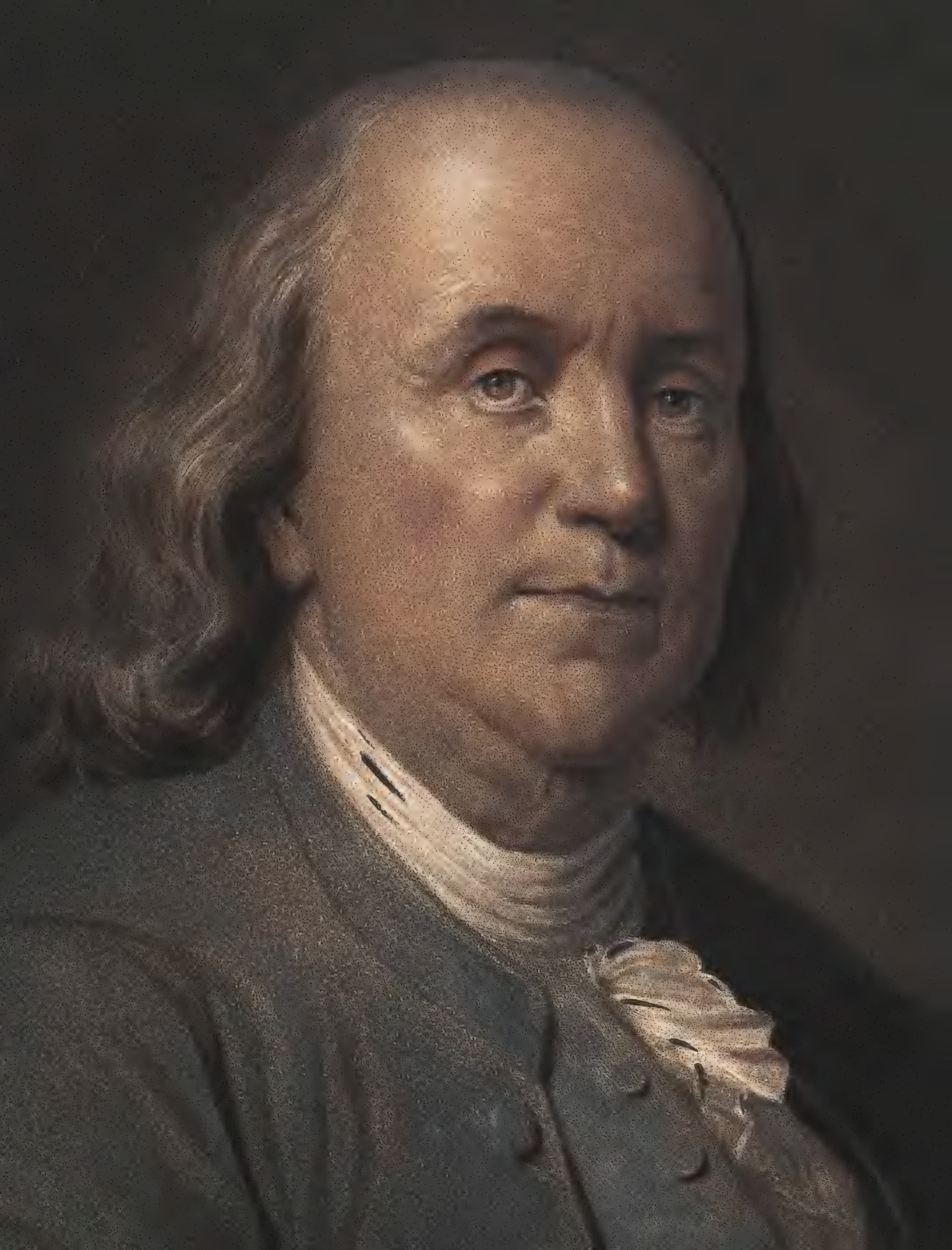
After ten days and nine rounds of classical chess, in which some of the games lasted more than five hours, the main tournament had ended. Greg Shahade, who lost to Nakamura, ended with an even score. Alexander Shabalov, a 35-year-old Riga-born grandmaster from Pittsburgh, was the new U.S. Chess Champion, and Jennifer Shahade and Krush found themselves tied with a third woman, Latvian émigré Anna Hahn, for the women's title. The next day, the three played a round-robin match of speed chess (15 minutes per side per game) to decide the winner. "I departed from my usual, more methodical style of preparation and tried to study every opening under the sun," Shahade said. "I knew it was a crazy, stupid thing to do—you can't possibly master numerous opening lines in one evening—but I couldn't help myself. I wanted to be prepared for anything they might play, and then all night I dreamed about the possibilities." Shahade arrived at the board nervous and exhausted, and lost her encounter with Krush. Hahn, 27, whose lower national ranking made her the underdog, managed to beat both of them and walk off with $12,500 and the title. "Anna is one of my friends," Shahade said, "but losing the play-off was not one of my happiest moments."

SHAHADE HAD GRADUATED from NYU only a month before the championship, and in Seattle she was in a reflective mood about what she was going to do with the rest of her life. "I majored in comparative literature," she told me. "It's a toss-up," she joked, "about whether comparative literature or chess will be more useful in paying the rent. I'm struggling right now with how much I want to make the game the focus of my life. I love chess, but it's the height of decadence. The positions you reach in a well-played game are beautiful, but the beauty is inaccessible to those who haven't mastered the game. There are many good reasons to teach kids chess—it helps them learn to concentrate, to think ahead, to see that their actions have consequences, to cope with defeat, and to be gracious in winning—but the game itself doesn't have a lot of social purpose. You can understand if someone is spending 16 hours a day trying to cure a disease or to write a novel, but to play better chess?" Shahade also remains ambivalent about the game from a feminist perspective: "Chess is patriarchal—I sound like a college student—it's a war game, a zero-sum game that rewards ruthlessness, not cooperation." Yet she is drawn to its intensity, and as a charismatic female in a largely male endeavor, she is enough of a novelty that she might be able to make a decent living from the game by giving lessons, exhibitions and motivational speeches; by publishing books and instructional videos; and by endorsing chess-playing computers.

"Today my life is balanced," says Shahade (à la Marilyn Monroe). In addition to creating a series of campy self-portraits, she's writing a book about women in chess.

Shahade also likes the arts—photography, painting, writing—and hopes to forge a career that melds them with chess. She has a contract to write a book about women in chess, and she has created a series of campy photographic self-portraits that play with the idea that a woman can be both a sex goddess and an intellectual. In these photographs, Shahade has made herself up to look like a vampish Marilyn Monroe. She wears a pink wig, pink gloves and a slinky pink dress. She appears ready to party, but closer examination reveals she is reading a book with a pink cover called *Secrets of Chess Tactics*. It's a classic Russian text that is serious even by the erudite standards of chess literature. ○

GABRIELLE REVLOCK



Returning to Philadelphia from England in 1775, the "wisest American" kept his political leanings to himself. But not for long ~ BY WALTER ISAACSON

Benjamin Franklin *Joins the Revolution*

BENJAMIN FRANKLIN, the Boston-born publisher of Poor Richard's Almanack, *the inventor of bifocals and the Franklin stove, the "penny saved is a penny earned" pioneer of self-help, the master negotiator and resourceful scientist, was also America's "most practical political thinker," says Walter Isaacson, author of a new biography,* Benjamin Franklin: An American Life. *Isaacson, former editor of* Time *and former chairman of CNN, recently became president of the Aspen Institute, a nonprofit policy forum in Washington, D.C. He sees something of a model in the sage of Philadelphia. Franklin "spent the first half of his career as a media executive, then changed course to become involved in education, public policy and world affairs."*

Franklin, who retired as a printer in 1748, played a role in forging America's independence, helping craft the Declaration of Independence itself, though after a change of heart. As late as the 1770s, both he and his son William, the royal governor of New Jersey, believed that the colonies should remain part of England. But the Stamp Act of 1765—a tax levied on the colonies—turned many against the Crown and spurred Franklin's advocacy of self-government. William remained a loyal subject, and the drama that would play out between father and son, Isaacson says, personified the tension between America's loyalists and revolutionaries.

In the excerpt that follows, which begins in April 1775, the 69-year-old Franklin has just sailed from London, where he served 18 years as a lobbyist for Pennsylvania and, months before, failed to broker a compromise that would permit Parliament to regulate trade and send troops to America but would give colonial legislatures the exclusive right to levy taxes. His wife, Deborah, who remained behind in Philadelphia, had died the year before at age 66. By now, he has concluded that there will be no reconciliation between England and her 13 colonies. But, for the time being, he is keeping his convictions to himself:

JUST AS HIS SON William had helped him with his famed kite-flying experiment, now William's son, Temple, a lanky and fun-loving 15-year-old, lent a hand as he lowered a homemade thermometer into the ocean. Three or four times a day, they would take the water's temperature and record it on a chart. Benjamin Franklin had learned from his Nantucket cousin, a whaling captain named Timothy Folger, about the course of the warm Gulf Stream. Now, during the latter half of his six-week voyage home from London, Franklin, after writing a detailed account of his futile negotiations, turned his attention to studying the current. The maps he published and the temperature measurements he made are now

A. SCHEFFER / AMERICAN PHILOSOPHICAL SOCIETY

Franklin's trick of seeming sage by saying nothing generated rumors. What was his game? Was he a secret loyalist?

included on NASA's Web site, which notes how remarkably similar they are to ones based on infrared data gathered by modern satellites.

The voyage was notably calm, but in America the long-brewing storm had begun. On the night of April 18, 1775, while Franklin was in mid-ocean, a contingent of British redcoats headed north from Boston to arrest the tea party planners Samuel Adams and John Hancock and capture the munitions stockpiled by their supporters. Paul Revere spread the alarm, as did others less famously. When the redcoats reached Lexington, 70 American minutemen were there to meet them. "Disperse, ye rebels," a British major ordered. At first they did. Then a shot was fired. In the ensuing skirmish, eight Americans were killed. The victorious redcoats marched on to Concord, where, as Ralph Waldo Emerson would put it, "the embattled farmers stood, and fired the shot heard round the world." On the redcoats' daylong retreat back to Boston, more than 250 of them were killed or wounded by American militiamen.

When Franklin landed in Philadelphia with his grandson on May 5, delegates of the Second Continental Congress were beginning to gather there. Among them was Franklin's old military comrade George Washington, who had become a plantation squire in Virginia after the French and Indian War. Yet there was still no consensus, except among the radical patriots in the Massachusetts delegation, about whether the war that had just erupted should be waged for independence or merely for the assertion of American rights within a British Empire. For that question to be resolved would take another year.

Franklin was selected as a member of the Congress the day after his arrival. Nearing 70, he was by far the oldest. Most of the 62 others who convened in the Pennsylvania statehouse—such as Thomas Jefferson and Patrick Henry from Virginia and John Adams and John Hancock from Massachusetts—had not even been born when Franklin first went to work there more than 40 years earlier. Franklin moved into the house on Market Street that he had designed but never known and where his late wife, Deborah, had lived for ten years without him. His 31-year-old daughter, Sally, took care of his housekeeping needs, her husband, Richard Bache, remained dutiful, and their two children, Ben, 6, and Will, 2, provided amusement. "Will has got a little gun, marches with it, and whistles at the same time by way of fife," Franklin wrote.

For the time being, Franklin kept quiet about whether or not he favored independence, and he avoided the taverns where the other delegates spent the evenings debating the topic. He attended sessions and committee meetings, said little, and dined at home with his family. Beginning what would become a long and conflicted association with Franklin, the loquacious and ambitious John Adams complained that the older man was treated with reverence even as he was "sitting in silence, a great part of the time fast asleep in his chair."

Many of the younger, hotter-tempered delegates had never witnessed Franklin's artifice of silence, his trick of seeming sage by saying nothing. They knew him by reputation as the man who had successfully argued in Parliament against the Stamp Act, not realizing that oratory did not come naturally to him. So rumors began to circulate. What was his game? Was he a secret loyalist?

As the Pennsylvania delegate William Bradford confided to the young James Madison, some of the other delegates had begun to "entertain a great suspicion that Dr. Franklin came rather as a spy than as a friend, and that he means to discover our weak side and make his peace with the ministers."

In fact, Franklin was biding his time through much of May because there were two people, both close to him, whom he first wanted to convert to the American rebel cause. One was Joseph Galloway, who had acted as his lieutenant and surrogate for ten years in the Pennsylvania Assembly but had left public life. The other was even closer to him—his 44-year-old son, William, who was the governor of New Jersey and loyal to the British ministry. William, having read of his father's return to Philadelphia in the newspapers, was eager to meet with him and to reclaim his son.

Benjamin and William chose a neutral venue for their summit: Trevose, Galloway's grand fieldstone manor house north of Philadelphia. The evening started awkwardly, with embraces and then small talk. At one point, William pulled Galloway aside to say that he had avoided, until now, seriously talking politics with his father. But after a while, "the glass having gone around freely" and much Madeira consumed, they confronted their political disagreements.

William argued that it was best for them all to remain neutral, but his father was not moved. Benjamin "opened himself and declared in favor of measures for attaining to independence" and "exclaimed against the corruption and dissipation of the kingdom." William responded with anger, but also with a touch of concern for his father's safety. If he intended "to set the colonies in flame," William said, he should "take care to run away by the light of it."

So William, with Temple at his side, rode back to New Jersey, defeated and dejected, to resume his duties as royal governor. The boy would spend the summer in New Jersey, then return to Philadelphia to be enrolled in the college his grandfather had founded there, the University of Pennsylvania. William had hoped to send him to King's College (now Columbia) in New York City, but Benjamin scuttled that plan because he believed the school had become a hotbed of English loyalism.

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"Look upon your hands!" Franklin upbraided a Parliament member. "They are stained with blood."

Benjamin Franklin's son William (left, c. 1790), the royal governor of New Jersey, was exiled to England during the Revolution and remained there until his death in 1814. The elder Franklin's common-law wife, Deborah (above, c. 1759), stepmother to William, died in 1774 at 66 while her husband, whom she called Pappy, was lobbying in England. William's son and the elder Franklin's "constant companion," Temple (right, c. 1790), served as Franklin's personal secretary in France during and after the war.

IT IS HARD TO PINPOINT when America decided that complete independence from Britain was necessary and desirable. Franklin, who for ten years had alternately hoped and despaired that a breach could be avoided, made his own private declaration to his family at Trevose. By early July 1775, a year before his fellow American patriots made their own stance official, he was ready to go public with his decision.

But it is important to note the causes of Franklin's evolution and, by extension, that of a people he had come to exemplify. Englishmen such as his father who had immigrated to a new land gave rise to a new type of people. As Franklin repeatedly stressed in letters to his son, America's strength would be its proud middling people, a class of frugal and industrious shopkeepers and tradesmen who were assertive of their rights and proud of their status. Like many of these new Americans, Franklin chafed at authority. He was not awed by established elites. He was cheeky in his writings and rebellious in his manner. And he had imbibed the philosophy of the new Enlightenment thinkers, who believed that liberty and tolerance were the foundation for a civil society.

For a long time he had cherished a vision in which Britain and America flourished in one great expanding empire. But he felt that it would work only if Britain stopped subjugating Americans through mercantile trading rules and taxes imposed from afar. Once it was clear that Britain remained intent on subordinating the colonies, the only course left was independence.

The bloody Battle of Bunker Hill and the burning of Charleston, both in June 1775, further inflamed the hostility that Franklin and his fellow patriots felt toward the British. Nevertheless, most members of the Continental Congress were not quite as far down the road to revolution. Many colonial legislatures, including Pennsylvania's, had instructed their delegates to resist any calls for independence.

On July 5, the same day that Franklin signed the Olive Branch Petition, which blamed Britain's "irksome" and "delusive" ministers for the troubles and "beseeched" the king to come to America's rescue, he made his rebellious sentiments public. In a letter to his longtime London friend (and fellow printer) William Strahan, he wrote in cold and calculated fury: "You are a Member of Parliament, and one of that Majority which has doomed my country to destruction. You have begun to burn our towns, and murder our people. Look upon your hands! They are stained with the blood of your relations! You and I were long friends: You are now my enemy, and I am Yours. B. Franklin."

Curiously, Franklin allowed the letter to be circulated—but he never sent it. Instead, it was merely a vehicle for publicizing his view. In fact, Franklin sent Strahan a much mellower letter two days later, saying, "Words and arguments are now of no use. All tends to a separation."

By early July, Franklin had become one of the most ardent opponents of Britain in the Continental Congress. No longer was there any doubt where Franklin stood. "The suspicions against Dr. Franklin have died away," Bradford now wrote to Madison. "Whatever was his design at coming over here, I believe he has now chosen his side and favors our cause." Likewise, John Adams reported to his wife, Abigail: "He does not hesitate at our boldest measures, but rather seems to think us too irresolute, and I suppose [British] scribblers will attribute the temper and proceedings of this Congress to him."

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Franklin was "not talkative," Abigail Adams said, but "when he spoke something useful dropped from his tongue."

For the colonies to cross the threshold of rebellion, they needed to begin conceiving of themselves as a new nation. The draft of the Articles of Confederation and Perpetual Union that Franklin presented to the Congress on July 21 contained the seeds of the great conceptual breakthrough that would eventually define America's federal system: a division of power between a central government and the states.

Under Franklin's proposal, the Congress would have only a single chamber, in which there would be proportional representation from each state based on population. The body would have the power to levy taxes, make war, manage the military, enter into foreign alliances, settle disputes between colonies, form new colonies, issue a unified currency, establish a postal system, regulate commerce and enact laws. Franklin also proposed that, instead of a president, the Congress appoint a 12-person "executive council" whose members would serve for staggered three-year terms. Franklin included an escape provision: in the event that Britain accepted all of America's demands and made financial reparation for all of the damage it had done, the union could be dissolved. Otherwise, "this confederation is to be perpetual." Franklin's proposed central government was more powerful than the one eventually created by Congress.

As Franklin fully realized, this pretty much amounted to a declaration of independence from Britain and a declaration of dependence by the colonies on each other. Neither idea had widespread support yet. So he read his proposal into the record but did not force a vote on it.

In the summer of 1776, Franklin (left, seated with Adams in a c. 1921 painting) advised Jefferson on the drafting of the nation's founding document.

By late August, when it was time for Temple to return from New Jersey to Philadelphia, William tentatively suggested that he might accompany the boy there. Franklin, uncomfortable at the prospect of his loyalist son arriving in town while the rebellious Congress was in session, decided to fetch Temple himself.

William tried hard to keep up the pretense of family harmony and in all his letters to Temple included kind words about his grandfather. William also tried to keep up with Temple's frequent requests for money; in the tug-of-war for his affections, the lad got fewer lectures about frugality than other members of his family had.

Given his age and physical infirmities, Franklin, now serving as America's first postmaster general, might have been expected to contribute his expertise to Congress from the comfort of Philadelphia. But always revitalized by travel, he embarked on a Congressional mission in October 1775.

The trip came in response to an appeal from General Washington, who had taken command of the motley Massachusetts militias and was struggling to make them, along with various backwoodsmen who had arrived from other colonies, into the nucleus of a continental army. With little equipment and declining morale, it was questionable whether he could hold his troops together through the winter.

Franklin and his two fellow committee members met with General Washington in Cambridge for a week. As they were preparing to leave, Washington asked the committee to stress to the Congress "the necessity of having money constantly and regularly sent." That was the colonies' greatest challenge, and Franklin provided a typical take on how raising £1.2 million a year could be accomplished merely through more frugality. "If 500,000 families will each spend a shilling a week less," he explained to his son-in-law, Richard Bache, "they may pay the whole sum without otherwise feeling it. Forbearing to drink tea saves three-fourths of the money, and 500,000 women doing each threepence worth of spinning or knitting in a week will pay the rest." For his own part, Franklin forked over his postmaster's salary.

At a dinner in Cambridge, he met John Adams' wife, Abigail, who was charmed, as she noted in a letter to her husband: "I found him social but not talkative, and when he spoke something useful dropped from his tongue. He was grave, yet pleasant and affable. . . . I thought I could read into his countenance the virtues of his heart; among which patriotism shone in its full luster."

On his way back to Philadelphia, Franklin stopped in Rhode Island to meet his sister, Jane Mecom, and take her home with him. The carriage ride through Connecticut and New Jersey was a delight for both Jane and Franklin. The good feelings were so strong that they were able to overcome any political tensions when they made a brief stop at the governor's mansion in Perth Amboy to call on William. It would turn out to be the last time Franklin would see his son other than a final, tense encounter in England ten years later. They kept the meeting short.

LIBRARY OF CONGRESS

"Will Doctor Franklin be so good as to peruse it?" asked Jefferson in a note with his draft of the declaration.

UNTIL 1776, most colonial leaders believed—or politely pretended to believe—that America's dispute was with the king's misguided ministers, not the king himself. To declare independence, they had to convince their countrymen, and themselves, to take the daunting leap of abandoning this distinction. One thing that helped them do so was the publication, in January of that year, of an anonymous 47-page pamphlet entitled *Common Sense*.

In prose that drew its power, as Franklin's often did, from Soon he was working for a Philadelphia printer and honing his skills as an essayist.

Paine's pamphlet galvanized the forces favoring outright revolution. On June 7, Virginia's Richard Henry Lee declared to Congress: "These United Colonies are, and of right ought to be, free and independent states."

Although the Congress put off a vote on the motion for a few weeks, it ordered the removal of all royal governments in the colonies. Patriotic new provincial congresses asserted themselves, including one in New Jersey that on June 15, 1776,

A Declaration by the Representatives of the UNITED STATES
OF AMERICA in General Congress assembled

Ever the scientist and rationalist, Franklin made a small but profound change in Jefferson's draft of the Declaration of Independence (above), replacing the religious phrasing "sacred and undeniable" with the secular—and now resoundingly familiar—"self-evident."

being unadorned, the author argued that there was no "natural or religious reason [for] the distinction of men into kings and subjects." Hereditary rule was a historic abomination. "Of more worth is one honest man to society and in the sight of God, than all the crowned ruffians that ever lived." Thus, there was only one path for Americans: "Every thing that is right or natural pleads for separation."

Within weeks of its appearance in Philadelphia, the pamphlet had sold an astonishing 120,000 copies. Many thought Franklin was the author, but his hand was more indirect: the real author was a young Quaker from London named Thomas Paine, who had failed as a corset maker and tax clerk before gaining an introduction to Franklin, who took a liking to him. When Paine decided he wanted to immigrate to America and become a writer, Franklin procured his passage in 1774 and wrote to Richard Bache to help get Paine a job.

declared that Gov. William Franklin was "an enemy of the liberties of this country." For his part, the elder Franklin was not acting particularly paternal. A letter he wrote to Washington the day that his son was being tried didn't mention that painful fact. Nor did he say or do anything to help his son when the Continental Congress, three days later, voted to have him imprisoned.

On the eve of his confinement, William wrote to his son, now firmly ensconced in his grandfather's custody, words that seem touchingly generous: "God bless you, my dear boy; be dutiful and attentive to your grandfather, to whom you owe great obligation." He concluded with a bit of forced optimism: "If we survive the present storm, we may all meet and enjoy the sweets of peace with the greater relish." They would, in fact, survive the storm, and indeed all meet again, but never to relish the peace. The wounds of 1776 would prove too deep.

CORBIS

"We must all hang together," John Hancock said. "Yes, indeed," Franklin replied, or "we shall all hang separately."

As THE CONGRESS prepared to vote on the question of independence, it appointed a committee for what would turn out to be a momentous task that at the time did not seem so important: drafting a declaration that explained the decision. The committee included Franklin, of course, and Thomas Jefferson and John Adams, as well as Connecticut merchant Roger Sherman and New York lawyer Robert Livingston.

The honor of drafting the document fell to Jefferson, then 33, who was the committee's chairman, because he had gotten the most votes from its members and he was from Virginia, the colony that had proposed the resolution. For his part, Adams mistakenly thought he had already secured his place in history by writing the preamble to an earlier resolution that called for the dismantling of royal authority in the colonies, which he wrongly proclaimed would be regarded by historians as "the most important resolution that ever was taken in America." As for Franklin, he was laid up in bed with boils and gout when the committee first met. Besides, he later told Jefferson, "I have made it a rule, whenever in my power, to avoid becoming the draughtsman of papers to be reviewed by a public body."

And thus it was that Jefferson had the glory of composing, on a little lap desk he had designed, some of the most famous phrases in American history while sitting alone in a second-floor room on Market Street a block from Franklin's home: "When in the course of human events . . . "

The document contained a bill of particulars against the British, and it recounted, as Franklin had often done, America's attempts to be conciliatory despite England's repeated intransigence. Jefferson's writing style, however, was different from Franklin's. It was graced with rolling cadences and mellifluous phrases, soaring in their poetry and powerful despite their polish. In addition, Jefferson drew on a depth of philosophy not found in Franklin. He echoed both the language and grand theories of English and Scottish Enlightenment thinkers, most notably the concept of natural rights propounded by John Locke, whose *Second Treatise on Government* he had read at least three times. And he built his case, in a manner more sophisticated than Franklin would have, on a contract between government and the governed that was based on the consent of the people.

When he had finished a draft and incorporated some changes from Adams, Jefferson sent it to Franklin on the morning of Friday, June 21. "Will Doctor Franklin be so good as to peruse it," he wrote in his cover note, "and suggest such alterations as his more enlarged view of the subject will dictate?"

Franklin made only a few changes, the most resounding of which was small. He crossed out, using the heavy backslashes that he often employed, the last three words of Jefferson's phrase "We hold these truths to be sacred and undeniable" and changed them to the words now enshrined in history: "We hold these truths to be self-evident."

The idea of "self-evident" truths drew less on John Locke, Jefferson's favorite philosopher, than on the scientific determinism espoused by Isaac Newton and the analytic empiricism of Franklin's close friend David Hume. By using the word "sacred," Jefferson had asserted, intentionally or not, that the principle in question—the equality of men and their endowment by their creator with inalienable rights—was one of religion. Franklin's edit turned it instead into an assertion of rationality.

On July 2, the Continental Congress finally took the consequential step of voting for independence. As soon as the vote was completed (there were 12 yeas and one nay), the Congress formed itself into a committee of the whole to consider Jefferson's draft declaration. They were not so light in their editing as Franklin had been. Large sections were eviscerated. Jefferson was distraught. "I was sitting by Dr. Franklin," he recalled, "who perceived that I was not insensible to these mutilations." At the official signing of the parchment copy on August 2, John Hancock, the president of the Congress, penned his name with flourish. "There must be no pulling different ways," he declared. "We must all hang together." According to the historian Jared Sparks, Franklin replied: "Yes, we must, indeed, all hang together, or most assuredly we shall all hang separately."

HAVING DECLARED the collective colonies a new nation, the Second Continental Congress now needed to create a new system of government. So it began work on what would become the Articles of Confederation. The document was not completed until late 1777, and it would take another four years before all 13 colonies ratified it, but the basic principles were decided during the weeks following the acceptance of the Declaration of Independence.

By July 1776, Adm. Richard Howe was commander of all British forces in America, with his brother, Gen. William Howe, in charge of the ground troops. He had gotten his wish of being commissioned to negotiate a reconciliation. He carried a detailed proposal that offered a truce, pardons for the rebel leaders (with John Adams secretly exempted) and rewards for any American who helped restore peace.

Because the British did not recognize the Continental Congress as a legitimate body, Lord Howe was unsure where to direct his proposals. So when he reached Sandy Hook, New Jersey, he sent a letter to Franklin, whom he addressed as "my worthy friend." He had "hopes of being serviceable," Howe declared, "in promoting the establishment of lasting peace and union with the colonies."

Congress granted Franklin permission to reply, which he did on July 30. It was an adroit response, one that made clear

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John Adams was included as a delegate to make sure Franklin would not revert to his old peace-seeking habits.

America's determination to remain independent, yet set in motion a fascinating final attempt to avert revolution. "I received safe the letters your Lordship so kindly forwarded to me, and beg you to accept my thanks," Franklin began. But his letter quickly turned heated, even resurrecting a phrase—"deluge us in blood"—that he had edited out of Jefferson's draft of the declaration:

"It is impossible we should think of submission to a government that has with the most wanton barbarity and cruelty burnt our defenseless towns in the midst of winter, excited the savages to massacre our peaceful farmers, and our slaves to murder their masters, and is even now bringing foreign mercenaries to deluge our settlements with blood."

Skillfully, however, Franklin included more than fury. "Long did I endeavor," he went on, "with unfeigned and unwearied zeal, to preserve from breaking that fine and noble china vase, the British empire; for I knew that, being once broken, the separate parts could not retain even their share of the strength or value that existed in the whole."

Perhaps, Franklin intimated, peace talks could be useful. If Britain wanted to make peace with an independent America, Franklin offered, "I think a treaty for that purpose is not yet quite impracticable."

Howe was understandably taken aback by Franklin's response. He waited two weeks, as the British outmaneuvered General Washington's forces on Long Island, before answering his "worthy friend." The admiral admitted that he did not have the authority "to negotiate a reunion with America under any other description than as subject to the crown of Great Britain." Nevertheless, he said, a peace was possible under terms that the Congress had laid out in its Olive Branch Petition to the king a year earlier, which included all of the colonial demands for autonomy yet still preserved some form of union under the Crown.

Franklin had envisioned just such an arrangement for years. Yet it was, after July 4, likely too late. Franklin felt so, and John Adams and others in his radical faction felt that way even more fervently. Congress debated whether Franklin should even keep the correspondence alive. Howe forced the issue by paroling a captured American general and sending him to Philadelphia with an invitation for the Congress to send an unofficial delegation for talks before "a decisive blow was struck."

Three members—Franklin, Adams and Edward Rutledge of South Carolina—were appointed to meet with Howe on Staten Island. The inclusion of Adams was a safeguard that Franklin would not revert to his old peace-seeking habits.

Howe sent a barge to Perth Amboy to ferry the American delegation to Staten Island. Although the admiral marched his guests past a double line of menacing Hessian mercenaries, the three-hour meeting on September 11 was cordial, and the Americans were treated to a feast of good claret, ham, tongue and mutton.

Howe pledged that the colonies could have control over their own legislation and taxes. The British, he said, were still kindly disposed toward the Americans: "When an American falls, England feels it." If America fell, he said, "I should feel and lament it like the loss of a brother."

Adams recorded Franklin's retort: "My Lord, we will do our utmost endeavors to save your Lordship that mortification."

Why then, Howe asked, was it not possible "to put a stop to these ruinous extremities?"

Because, Franklin replied, it was too late for any peace that required a return to allegiance to the king. "Forces have been sent out and towns have been burnt," he said. "We cannot now expect happiness under the domination of Great Britain. All former attachments have been obliterated." Adams, likewise, "mentioned warmly his own determination not to depart from the idea of independency."

The Americans suggested that Howe send home for authority to negotiate with them as an independent nation. That was a "vain" hope, replied Howe.

"Well, my Lord," said Franklin, "as America is to expect nothing but upon unconditional submission . . . "

Howe interrupted. He was not demanding submission. But, he acknowledged, no accommodation was possible, and he apologized that "the gentlemen had the trouble of coming so far to so little purpose."

WITHIN TWO WEEKS of his return from meeting Lord Howe, Franklin was chosen, by a Congressional committee acting in great secrecy, to embark on the most dangerous and complex of all his public missions. He was to cross the Atlantic yet again to become an envoy in Paris, with the goal of cajoling from France, now enjoying a rare peace with Britain, the aid and alliance without which America was unlikely to prevail.

Franklin was elderly and ailing, but there was a certain logic to the choice. Though he had visited there only twice, he was the most famous and most respected American in France. In addition, Franklin had held confidential talks in Philadelphia over the past year with a variety of French intermediaries and believed that France would be willing to support the American rebellion. Franklin professed to accept the assignment reluctantly. "I am old and good for nothing," he said to his friend Benjamin Rush, who was sitting next to him in the Congress. "But as the storekeepers say of their remnants of cloth, I am but a fag end, and you may have me for what you are pleased to give." But he was secretly pleased.

He knew he would love Paris, and it would be safer than America with the outcome of war so unclear. (Howe was edging closer to Philadelphia at the time.) Indeed, a few of

Though elderly and ailing, Franklin was a logical choice for envoy because he was the most famous American in France.

Franklin's enemies, including the British ambassador to Paris, thought he was finding a pretense to flee the danger.

Such suspicions were probably too harsh. If personal safety were his prime concern, a wartime crossing of an ocean controlled by the enemy's navy at his advanced age while plagued with gout and kidney stones was hardly the best course. Surely the opportunity to serve his country, and the chance to live and be feted in Paris, were reasons enough. Before departing, he withdrew more than £3,000 from his bank account and lent it to the Congress for prosecuting the war.

His grandson Temple had been spending the summer taking care of his forlorn stepmother in New Jersey. The arrest of her husband had left Elizabeth Franklin, who was fragile in the best of times, completely distraught. Benjamin sent some money to Elizabeth, but she begged for something more. Couldn't he "parole" William so he could return to his family? Franklin refused, and dismissed her complaints about her plight by noting that others were suffering far worse at the hands of the British.

Temple was more sympathetic. In early September, he made plans to travel to Connecticut to visit his captive father and bring him a letter from Elizabeth. But Franklin forbade him to go. Less than a week later he cryptically wrote Temple: "I hope you will return hither immediately and your mother will make no objections to it. Something offering here that will be much to your advantage."

In deciding to take Temple to France, Franklin never consulted with Elizabeth, who would die a year later without seeing either her husband or stepson again. Nor did he inform William, who did not learn until later of the departure of his only son, a lad he had gotten to know for only a year.

Franklin also decided to take along his other grandson, his daughter's son, Benny Bache. So it was an odd trio that set sail on October 27, 1776, aboard a cramped but speedy American warship aptly named *Reprisal*: a restless old man about to turn 71, plagued by poor health but still ambitious and adventurous, heading for a land from whence he was convinced he would never return, accompanied by a high-spirited, frivolous lad of about 17 and a brooding, eager-to-please child of 7. Two years later, writing of Temple but using words that applied to both boys, Franklin explained one reason he had wanted them along: "If I die, I have a child to close my eyes."

In France, Franklin engaged in secret negotiations and brought France into the war on the side of the colonies. France provided money and, by war's end, some 44,000 troops to the revolutionaries. Franklin stayed on as minister plenipotentiary, and in 1783 signed the Treaty of Paris that ended the war. He returned to the United States two years later. Then, as an 81-year-old delegate to the federal Constitutional Convention in Philadelphia in 1787, Franklin played perhaps his most important political role: urging compromise between the large and small states in order to have a Senate that represented each state equally and a House proportional by population. He knew that compromisers may not make great heroes, but they do make great democracies. He died in 1790 at age 84.

At 22, Franklin's epitaph for himself, a mere "printer" (above), would prove a monumental understatement. He died 62 years later, and the Philadelphia grave site he shares with his wife is even more plainly marked: "Benjamin and Deborah Franklin: 1790."

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Shore Thing

In the new Boston Harbor Islands national park, city dwellers can escape the madding crowds

BY DOUG STEWART

PHOTOGRAPHS BY BOB KRIST

In 1837, when novelist Nathaniel Hawthorne strolled bucolic Thompson Island (above), he mused: "It seems like a little world by itself."

DOREE COX AND KATHARINE WOLFE sport bedrolls, water bottles, and backpacks bulging with MREs (Meals Ready to Eat) ordered from a military catalog. For these wilderness hikers, Maine is old hat, the Adirondacks a walk in the park. But roughing it in the middle of Boston Harbor? Now you're talking.

"We had the whole island to ourselves," said Cox, 77, after camping for two nights on 62-acre Lovell's Island. "We made a fire on the beach, ate dinner and watched the lights of Boston go on." Their one regret? Not being able to harvest the wild blackberries growing everywhere in the tangled thickets. "The berries won't be ripe for a few weeks," says Wolfe, 64.

"We watched seagulls drop mussels on the rocks, to break open the shells," says Cox. "The planes from Logan Airport took off right over the campsite every 70 seconds, so there was a bit of a roar, but it was an absolutely fantastic experience."

For those who make the effort to reach them, Boston's harbor islands offer scenic beauty and history. Yet they lie virtually unnoticed at the doorstep of the nation's seventh-largest metropolitan area.

1. The Graves
2. Outer Brewster Island
3. Shag Rocks
4. Little Brewster Island
5. Great Brewster Island
6. Middle Brewster Island
7. Calf Island
8. Little Calf Island
9. Green Island
10. Snake Island
11. Deer Island
12. Lovell's Island
13. George's Island
14. Gallop's Island
15. Nixes Mate
16. Long Island
17. Rainsford Island
18. Peddock's Island
19. Bumpkin Island
20. World's End
21. Langlee Island
22. Sarah Island
23. Button Island
24. Ragged Island
25. Slate Island
26. Webb State Park
27. Grape Island
28. Sheep Island
29. Raccoon Island
30. Nut Island
31. Hangman Island
32. Moon Island
33. Thompson Island
34. Spectacle Island

The park's 34 islands all lie within 12 miles of Boston. A late-19th-century guidebook described the urban archipelago as "emeralds on a sapphire plain, full of poetic charm."

To transform the neglected offshore wilderness into a center-stage attraction, the federal government created one of the nation's most unusual national parks in 1996. The 1,600 acres of land making up the Boston Harbor Islands National Park Area encompasses some 30 islands and several peninsulas, all within a 12-mile radius of downtown. They range from 248-acre World's End peninsula, whose carriage paths were laid out by Frederick Law Olmsted, to tiny outcrops like Button Island, accessible only by boat. The National Park Service, engaged in an innovative approach to stewardship, manages the park in partnership with the city of Boston, state agencies and a pair of private nonprofit groups.

More than 100,000 ferry passengers visit annually, a figure that hasn't budged from the days when it was just a state park. Guidebooks to Boston barely mention the park's existence. One reason is its lack of amenities: the islands share a single snack bar and just one rest room with running water (both on George's Island). Park superintendent George Price thinks the numbers will climb after the park's first full-fledged visitor's center opens on Spectacle Island, possibly next summer. "It's one island you can see from a lot of Boston neighborhoods," he says. Price hopes that new attractions, from outdoor concerts to food concessions, will eventually draw half a million visitors each year.

The new park doesn't teem with endangered species or boast pristine wilderness enclaves. Its attractions are tied to a dramatic history at the margins of society, as the island names suggest: Hangman, Bumpkin, Ragged, Shag Rocks, The Graves.

"For centuries, the harbor islands have been the place where Boston put what it didn't want to see or deal with, from prisoners to the mentally ill to horse-rendering facilities," says former congressman Gerry Studds, who championed the creation of the park in the mid-1990s. Since before the Boston Tea Party, everything from bare-knuckled boxing to prostitution flourished here largely out of sight of both proper and not-so-proper Bostonians. "Ironically, in a city that from its beginnings has made its livelihood from the sea," says Studds, "most people today are unaware that they have a harbor full of islands."

Fifty years ago, Spectacle Island, closest to the inner harbor, was a city dump oozing toxic waste into the surrounding waters and smoldering with underground fires from burning trash. Fort

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DOUG STEWART is a writer based in Ipswich, Massachusetts. Photographer BOB KRIST works from New Hope, Pennsylvania.

MIKE REAGAN

Thompson Island has housed successive schools for boys (today's Willauer students join Outward Bound programs, above, and monitor birdhouses, below). In his diary, Nathaniel Hawthorne recalled "wheat, pumpkins, pastures;—all cultivated by the boys."

Warren, a sprawling mid-19th-century redoubt on George's Island, was eyed as a radioactive-waste depot. Thanks to a public outcry, and a 13-year campaign led by local historian Edward Rowe Snow, the islands became a state park in 1970. Though nominally protected, they continued to languish into the 1990s, short of funds, attention and respect.

Part of the problem was pollution; until ten years ago, Boston and 43 other towns were pouring raw sewage into the harbor. Today, after massive clean-up efforts, beaches have reopened, clammers are digging again and harbor seals and even porpoises are back. Not long ago a juvenile humpback whale was spotted frolicking a few hundred yards off Deer Island, site of Boston's gleaming new 150-acre, $3.8 billion waste-treatment facility.

If Deer Island houses a high-tech complex, Thompson Island, with its oak and birch forests and salt marshes, is a beckoning retreat. In private hands almost continuously since 1626, when Scotsman David Thompson built a trading post that was likely Boston's first permanent structure, the island is now owned by the Thompson Island Outward Bound Education Center, a foundation that operates a school for boys on it and hosts Outward Bound courses for all ages. The island is open for public tours on Saturdays.

Thompson has been home to institutions of learning since 1833, when a school for indigent boys was founded "for the reformation of boys who . . . are in danger of becoming vicious or useless members of society." The reform-school taint is gone, but the emphasis on urban youth remains. Willauer is the island's academically challenging school for 50 adolescent boys, most of whom ride the ferry back and forth every day to its hilltop clearing campus.

Some of the Willauer boys had never visited a national park before—or even ridden in a boat. "The cool thing about this island is there's so many birds," says eighth grader Anthony Estremera, 14, inspecting the birdhouses he and his classmates placed in a meadow the day be-

George's Island (below) is the site of Ft. Warren (dating from 1834, the bastion, above, held Confederate prisoners in the Civil War). When architect Thomas Wharton toured the fort in 1853, he marveled at the "outer parapet, rising 69 feet above tide water."

fore. Now he shouts, "That's my box! There's a bird in it!" Not just any bird, it turns out, but an Eastern bluebird, its numbers slowly recovering from Maine to Mexico. "I can't believe a bird is already living there." At home in Dorchester, his inner-city Boston neighborhood, threatened species are hardly an everyday sight.

At extreme low tide, a gravel spit connects Thompson to the mainland at Quincy. The depth of Boston Harbor is rarely more than 50 feet; many areas are shallower than the deep end of a swimming pool. Not long ago (geologically speaking) most of it was dry land. Many of the islands and much of the Massachusetts coast are mounds of glacial till, or drumlins, deposited by ice age glaciers during the past 100,000 years. As recently as 6,000 years ago, the islands were hills set amid grassy and forested lowlands. As glaciers worldwide melted over the next thousand years, sea levels rose dramatically. The lowlands flooded, leaving one of the world's few drowned drumlin fields.

In the rich estuaries around the harbor, Indians caught fish and gathered shellfish. In the uplands, they hunted deer and grew corn, beans and squash. Archaeologists have turned up everything from drill bits and stone weights, used to anchor fishing nets, to beads made of bone, cunningly hammered and wrapped in copper loops. In the 1600s, however, English settlers displaced the native inhabitants by treaty and by force. After a bitter conflict known as King Philip's War broke out between colonists and Indians in the 1670s, settlers turned on all Native Americans, including peaceful Christianized Indians.

"They were rounded up under chain and musket, deported to Deer Island with nothing but blankets, and left there to die,"

Located on Little Brewster, Boston Light is America's last fully manned lighthouse (Coast Guard caretakers include, from left, Carlos Colón, Pedro Gonzalez, Ben O'Brien; right, O'Brien cleans the lens). Says Gonzalez: "It's pretty cool being stationed out here."

says Mildred McCowan, 61, a national park adviser who traces her lineage to internment survivors. As many as 3,000 Indians may have succumbed to starvation, exposure and disease. "It was a death camp," McCowan says. Memorials are planned to commemorate these Native Americans, as well as the more than 700 Irish immigrants who died of smallpox and yellow fever when the island was a quarantine station in the mid-1800s.

Indeed, much of the harbor islands' past bears a grim undercurrent. For centuries, their shores have been graveyards for foundering ships and drowned sailors. Hostilities have shaped the islands' history since the Revolution, as evidenced by the remains of many old forts. Fort Andrews, on Peddock's Island, was built in 1900, after the Spanish-American War, to guard the port of Boston. Today it lies in ruins.

Fort Warren, which dominates George's Island and is reachable by ferry departing from Boston's Long Wharf, is the national park's crown jewel. In the 1830s, when former West Point superintendent Sylvanus Thayer designed the bastion, it was considered state of the art. Today, with its ten-foot-thick stone walls, hand-cut granite spiral staircases and ghostly Corridor of Dungeons, it has the air of a medieval relic.

In a moist-walled granite room that once housed Confederate prisoners, volunteer tour guide Charlie Boyer, 78, a white-haired former deputy sheriff with a heavy Boston accent, recounts the legend of the Lady in Black, the wife of a Southern prisoner. As the story goes, she stole ashore here with a gun in 1862 and was hanged as a spy at what is now the picnic grounds. "She's been seen here 28 times since," Boyer says solemnly.

Two miles to the east, the harbor's most recognizable landmark, Boston Light, rises on the four-acre rock known as Little Brewster. In operation since 1716, the light is the oldest and the last fully manned Coast Guard lighthouse in the country. After only a year on the job, the first light keeper and his two daughters drowned in 1718, rowing to land in a gale. An enterprising young Boston resident, Benjamin Franklin, quickly wrote a poem about the tragedy and peddled it around town, although, he would confess in his autobiography, the verse was "wretched stuff." During the War of 1812, a keeper and his wife had a firsthand view of the battle of the American warship *Chesapeake* and the British frigate *Shannon*, but they were beyond earshot of the American commander, Capt. James Lawrence, who implored his men: "Don't give up the ship!" (or words to that effect).

Except for George's Island, accessible by ferry, most islands are reachable only by private boat (here, members of the Hull Lifesaving Museum traverse open-channel waters in a wooden lifeboat). Says one rower: "We were pushing hard against the current."

Sharing light-keeping duties today are Coast Guard petty officers Pedro Gonzalez, age 28, Ben O'Brien, 25, and Carlos Colón, 27, who enjoy satellite TV, an Internet connection, and Sam and Cyrus, the two lighthouse dogs. Colón, a native of Puerto Rico, appreciates even the winter nights here. "When there's a storm and you see the light rotating through the snow, it's beautiful." The park runs boat trips to the light four days a week in summer, weather permitting, at $30 a head.

Twelve months a year, anyone who doesn't mind getting soaked to the skin and is willing to grip an oar can get to the islands courtesy of the Hull Lifesaving Museum, located in the coastal town of Hull. Early one Saturday morning, a team of six rowers sets out in a 32-foot gig, hauling on splintered wooden oars. This was a treacherous place, says the museum's Ed McCabe, 54, "if you were sailing a square-rigger into Boston Harbor." He is describing Brewster Spit, a gravel shoal extending west from the island of Great Brewster for nearly a mile. At high tide, it's invisible. Between tides, it looks like a foamy rupture in the harbor.

After an hour's rowing, McCabe and crew fetch up on Calf Island. Here actress Julia Arthur, known as the Sarah Bernhardt of America, summered during the 1890s. All that's left of the ballroom in her mansion is a mosaic, made of beach stones, over the fireplace. Vandalism, even more than the elements, is the culprit: boaters have come ashore here for generations.

For now, Calf and at least a dozen other islands, including tiny 11-acre Rainsford, remain visit-at-your-own-risk destinations. Rainsford was a quarantine station for 18th-century immigrants; it housed a smallpox hospital in the 19th and a reform school in the 20th. "I've heard my great-uncle Jack was one of the bad boys out here between 1900 and 1910," says Ellen Berkland, Boston's city archaeologist, on hand with archaeologist Stefan Claesson and historian Elizabeth Carella for a fact-finding dig. "People are amazed how much of the past resides here," says Carella.

Some of the unmarked graves of Rainsford's cemetery, overgrown with lilacs and lilies gone wild, date to the early 1700s. Beyond the cemetery lie the ruins of the smallpox hospital, once a stately granite edifice. A bit farther on, a smooth slate outcrop jutting above a cove contains scores of names and dates from the early 1800s, some hastily scratched into the surface, others bordered and serifed as elegantly as script incised on a headstone.

Only a short distance away, on Peddock's Island, a 4,100-

A handful of residents (including Claire and Bill Hale, above) still summer on Peddock's. The couple, passionate advocates of the island's tranquil beauties (which include a 1940s chapel, below), want the park service to preserve at least one cottage as a museum.

year-old skeleton—the oldest human remains found in New England—was unearthed in the late 1960s by a woman digging in her garden. That Peddock's has a residential community at all is one of the park's peculiarities. Once a fishing village of Azorean immigrants, the settlement is now a dwindling summer colony. Lawns and flower gardens are well tended, but most of the 32 cottages are spartan. It's undoubtedly the only Boston-area neighborhood with functioning outhouses.

Claire Hale, 68, has summered here since she was a child. "In 1939, my father and mother bought a cottage for ten dollars," she says, seated in a rocker on her front porch next to a car battery she uses to power her TV. She and her husband, Bill, pump their own well water and read by the light of kerosene lamps.

The Hales have life tenure; after they die, the park will probably take over their neat two-story cottage. "We're trying to turn one of the cottages into a museum," she says. "This island has real history, and people need to know about it."

A short walk from the Hales' cottage lies Prince's Head, a sliver of promontory apparently never inhabited. In the 1940s, an armament works on nearby Nut Island used Prince's Head for target practice, but pounding waves have done more damage

than artillery shells. The tiny ridge is shrinking fast. "It's going to be gone in our lifetimes, easily," says Peter Rosen, a coastal geologist. In fact, he adds, all the harbor islands are eroding.

So if you're considering a visit, don't dally. "In a thousand years, there will be no harbor islands," Rosen says. Then he corrects himself. "In a thousand years, Beacon Hill, Bunker Hill, the other hills of Boston—those will be the new harbor islands." ○

Why Lewis and Clark Matter

Amid all the hoopla, it's easy to lose sight of the expedition's true significance — BY JAMES P. RONDA

AS THE LEWIS AND CLARK bicentennial approaches—the Corps of Discovery set out from Camp Dubois at the confluence of the Mississippi and Missouri rivers on May 14, 1804—all the signs of a great cultural-historical wallow are in place. Hundreds of Lewis and Clark books are flooding the market—everything from *The Journals of the Lewis and Clark Expedition* to Gary Moulton's magnificent 13-volume edition of the expedition's journals, to cookbooks, coloring books and trail guides. A gift catalog from Thomas Jefferson's Monticello offers stuffed versions of a prairie dog, a bison and a Newfoundland dog made to look like Seaman, the animal that accompanied Lewis on the trip. You can even order dolls of Meriwether Lewis and William Clark, Sacagawea and York "with detailed removable clothing."

There are Corps of Discovery television documentaries, an IMAX movie and dozens upon dozens of Internet Web sites. There are Lewis and Clark conferences, museum exhibitions and trail rides. Last summer Harley-Davidson motorcycle riders drove parts of the trail. When Harley hogs discover Lewis and Clark, you know something big is going on!

Now I would be the last person to dump mashed potatoes on all of this; after all, I've written four books about the expedition. Much of this bicentennial celebration is good, clean family fun that's both informative and entertaining. But in all this hoopla I fear that we may miss the underlying significance of the Lewis and Clark story and the chance to connect these early explorers to the larger and richer stories of our past. On the road with Thomas Jefferson's Corps of Discov-

Six accounts by Corps members (a woodcut, below, from Gass' journal, 1810 edition) have provided grist for generations of historians.

Captain Lewis & Clark holding a Council with the Indians.

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ery, or even standing alongside the trail as they pass by, we meet ourselves, and more important, we meet people who are not ourselves.

Lewis and Clark were not the first white men to cross the continent from the Atlantic to the Pacific north of Mexico. (Scottish fur trader Alexander Mackenzie crossed Canada a decade earlier.) Nor did they visit places not already seen and mapped by generations of native people. You could even say that Lewis and Clark began the American invasion of the West, which aimed at making it safe for cows, corn and capital at the expense of bison, prairie grasses and cultures not fitting the expansionist agenda. If we want to be hard edged, we could even make a case that the Lewis and Clark story is a mainstay of the same shelf-worn narrative that glorifies and justifies the American conquest and dispossession of the North America natives. (Textbook history often portrays Lewis and Clark as the vanguard of America's triumphant westward expansion, a movement that brought civilization and progress to a savage wilderness.) But it does seem to me that there are several reasons why Lewis and Clark *do* matter—and why we are so drawn to them.

First, what happened to the Corps is a great story, brimming with energy and full of forward motion. In extraordinary settings, a remarkable cast of characters encountered adversity of epic proportions and struggled through one adventure after another.

American novelist Willa Cather once noted that there are only two or three great human stories—and that we are destined to keep repeating them over and over again. One of these is the journey. Some of the oldest Indian stories are about journeys. There are the journeys of Africans and Europeans coming to North America, settlers pushing west by way of the Oregon Trail and the transcontinental railroad, and Chinese women and men traveling from places such as Shanghai and Guangdong Province to California, Idaho and Wyoming. Journeys took—and continue to take—Spanish-speaking men and women to El Norte. In the 20th century, the journeys of African-Americans from the rural South to the urban, industrial North re-made the racial, cultural and political map of the United States.

We are a people in motion, whether on the Trail of Tears, Route 66 or the Interstate System. From Jack Kerouac to Willie Nelson, the lure of the road and the promise of the journey still hold us. And it was Lewis and Clark who gave us our first great national road story.

Second, the Lewis and Clark expedition resonates because it's not just a white man's army, but rather a group of people from many different racial, ethnic, cultural and social backgrounds—a human community as diverse as any in America today. Consider York, William Clark's slave and fellow adventurer, or Pierre Cruzatte, the one-eyed fiddle player, who was part French and part Omaha Indian. There was German-born Pvt. John Potts, a miller by trade and a soldier most likely by necessity. Here is Sacagawea, a Shoshone woman who spent formative years with the Hidatsa Indians, and Jean Baptiste Charbonneau, a child of mixed Shoshone-French ancestry. Imagine the sounds around the campfire: William Clark's Virginia-Kentucky drawl, Sgt. John Ordway's New Hampshire inflections, George Drouillard's Shawnee-flavored French, and the cries and first words of Jean Baptiste, the baby born to Sacagawea on the trip. This is the crazy quilt that was and is America.

But Sacagawea aside, isn't the expedition a man's story? Not entirely. A close reading of the expedition records reveals that women were a part of the journey every step of the way. Philadelphia seamstress Matilda Chapman sewed 93 shirts for the expedition; women did laundry and sold provisions to the expedition as it overwintered

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Not just a white man's army, the Corps of Discovery was a human community as diverse as any found in America today.

A bicentennial event at Monticello in October drew some 4,000 participants.

outside St. Louis; Arikara, Mandan and Hidatsa women were a constant part of expedition life up the Missouri, providing food and friendship; Lemhi Shoshone women carried expedition baggage over the Continental Divide; a Nez Perce woman named Watkuweis brokered friendly relations between the Americans and her tribe; Chinook women, camped outside Fort Clatsop, offered themselves in return for valued trade goods, including metal tools, cloth and even uniform buttons.

Indeed, native people of both sexes lie at the heart of the Lewis and Clark journey; it is they who make it such a compelling story. On the day before the expedition's official start, William Clark wrote that the expedition's "road across the continent" would take the Corps through "a multitude of Indians." We can name the names: the Otoe chief Big Horse (Shingto-tongo), the Brulé Teton Sioux chief Black Buffalo Bull (Un-tongar-Sar-bar), the Mandan chief Black Cat (Posecopsahe), the Lemhi Shoshone chief Cameahwait (Too-et-te-conl), the Nez Perce chief Five Big Hearts (Yoom-park-kar-tim),

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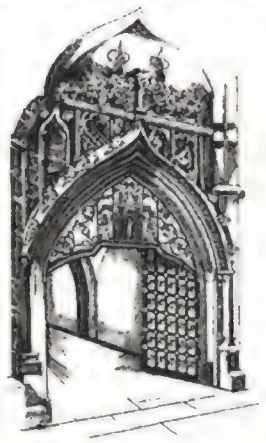

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ANDREW SHURTLEFF

the Walula chief Yelleppit and the Clatsop village headman Coboway.

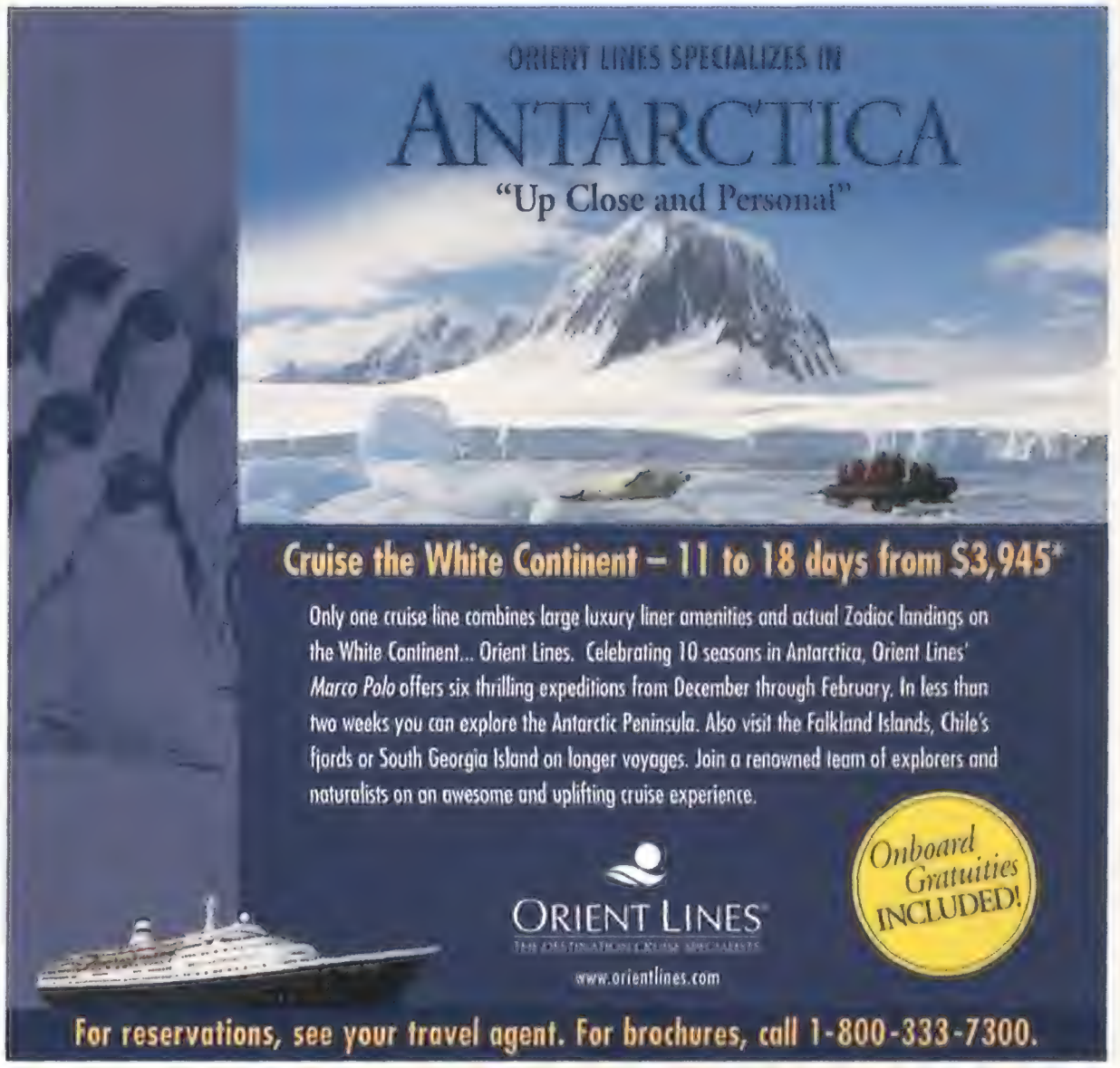
Finally, this is a story of the kind novelist Henry James once called "the visitable past." We can still float the Upper Missouri and look on what Lewis described as "seens of visionary inchantment." We can stand at Lemhi Pass and see the distant Bitterroots. We can hike parts of the Lolo Trail and visit Fort Clatsop.

Historian Donald Jackson once observed that Lewis and Clark were the "writingest" explorers in American history. The expedition diarists—all seven if we count the still-missing Robert Frazer journal—wrote about everything from bison, thunderstorms and tribal politics to river currents, mountain ranges and prairie plants. Some of it is dull, recording miles traveled and campsites set up. But there are also passages of the most marvelous, flashing prose, which brings the West alive, leaps the abyss of time and dances for us across the page. And all of it, whether dull or delightful, is written in a way we can understand.

LEWIS AND CLARK matter today because they act as a benchmark by which we can measure change and continuity in everything from the environment to relations between peoples. But more than that, their adventure reminds us that we are not the first Americans (native and newcomers alike) to face difficult choices in troubled times. William Clark, Sacagawea and Coboway lived in a complex, often violent age. The winds of change blew as hard then as now.

When honestly told, the Lewis and Clark story inspires without leading us into simpleminded platitudes. History humanizes us by giving names, faces and texture to our physical and mental landscapes. Not only do the Lewis and Clark stories entertain us, they serve as a map and guide for life on the American road. ○

JAMES P. RONDA holds the H.G. Barnard Chair in Western American History at the University of Tulsa, in Oklahoma.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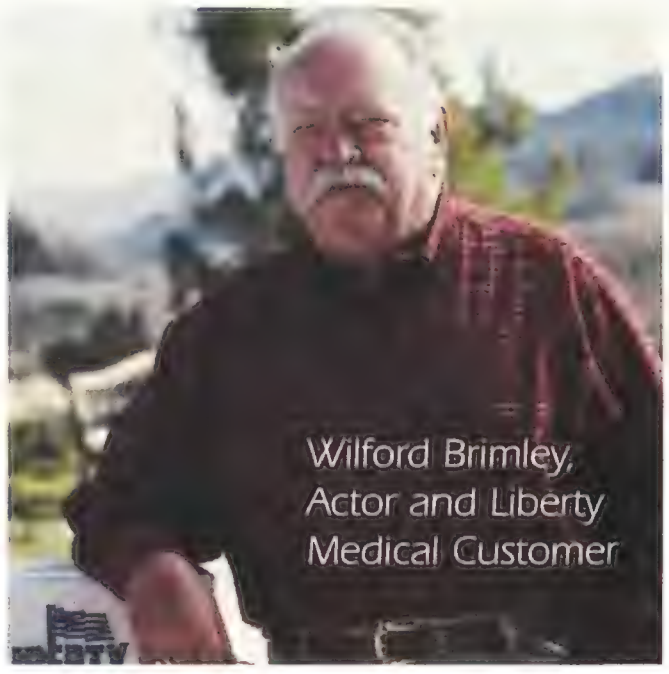

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To Touch the Heavens

Noreen Grice has given the visually impaired a feel for the universe ~ BY DAVID L. CHANDLER

"Every time I'd see somebody walk in with a guide dog or a white cane," says Grice, "I'd run after them with the tactile pictures and ask, 'Does this work for you?'"

She asked the blind students what they thought of the planetarium show. "That stunk!" said one. Grice said to herself, Why does it have to stink? Then she said, "Wait a minute. The thing that's missing is the pictures."

ALL: PAULA LERNER

NEARLY THREE years ago, astronomer Noreen Grice was spending all her weekends working—not gazing up at the stars, but hunched over her kitchen table in Connecticut carving circles, scoring squiggles and jabbing bumps into thin, record-album-size sheets of aluminum. Even so, she was focused on the universe: she was creating tactile "pictures" that would allow the blind—for the first time ever—to "see" photographs of planets, nebulae and galaxies. Says Grice, who presents planetarium shows at Boston's Museum of Science: "I had very sore wrists."

This past November, the aluminum sheets that Grice painstakingly fashioned became the basis for a book, *Touch the Universe* (Joseph Henry Press, Washington, D.C.). It's a collection of 14 pictures taken by the Hubble Space Telescope, the 43.5-foot-long earth-orbiting satellite that since 1990 has beamed back images of planets, stars and galaxies, including the most distant views of the universe ever taken by an optical telescope. In Grice's book, Hubble's snapshots appear in full color for the sighted. And for the blind—thanks to Grice's sore wrists—the contours of Saturn's rings, the swirl of Jupiter's Great Red Spot, even the brilliant color of interstellar gas clouds are conveyed by ridges and bumps embossed on the images.

Astronomy, with its forever-out-of-reach subject matter, might seem the unlikeliest science to translate for touch. But for Grice, 40, who has the openness, earnestness and affability of a natural teacher, the only question was, why not? It started with a chance encounter that she had in 1984 during the summer before her senior year at

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Boston University while working as an intern at the Museum of Science. Students from the nearby Perkins School for the Blind were visiting, and Grice had helped them to their seats at the planetarium. After the show, she asked what they thought of it.

"That stunk!" said one.

Like most planetarium shows, it had been a visual journey through the night sky. There had been no explanation that might have helped those who couldn't see it for themselves to know what it was all about. Grice thought, Why does it have to stink?

She decided to write a brochure that could be produced in Braille. "Then I said, 'Wait a minute. That's not what's missing. The thing that's missing is the pictures.'" A day or two later, she took the bus to the Perkins School library. "I pulled the astronomy books down and I flipped through them, and there wasn't one picture," she says. Later, Grice learned that the only tactile illustrations available were made by an expensive, labor-intensive process of molding plastic over objects hand-glued onto cardboard.

Back at Boston University, searching for a senior project, she walked into her professor's office and said, "I'd like to write an astronomy book for the blind." But though Grice completed the text for the book and earned her degree, she couldn't come up with a way to produce the illustrations she envisioned.

In 1987, after earning her master's in astronomy at San Diego State University (where she met her husband, Western Connecticut State University astronomer Dennis Dawson), she returned to work at the museum. But the problem of illustrating the book nagged at her. "I hadn't finished it," she says, "and I *always* complete projects."

A few months later, she happened on a brochure for a VersaPoint machine, essentially a printer that can convert images drawn on a computer into patterns of raised dots on paper.

DAVID L. CHANDLER writes frequently about astronomy. He lives in Massachusetts.

The raised Hubble images (above, the Ring Nebula) are "pretty cool," said one student.

Grice got a grant to buy one of the machines and set to work. With it she made a few bas-relief pictures—diagrams of constellations and the phases of the moon—to hand to the visually impaired at the planetarium shows. Suddenly, blind visitors found that the show didn't stink quite as much.

By 1989, with $6,000 from the museum, Grice had produced 400 copies of a book of astronomical diagrams titled *Touch the Stars*. (A revised edition, *Touch the Stars II,* is now published by National Braille Press.) Worried that the museum would get stuck with a pile of unsold books, Grice says, "I was really sweating." She needn't have. The 400 copies sold out within a year, and so did a second run of 800.

In 1999, out of the blue, she got an e-mail from DePaul University astronomy professor Bernhard Beck-Winchatz proposing that she develop a book of tactile Hubble Space Telescope images. Beck-Winchatz, who also serves as the associate director of DePaul's NASA Space Science Center for Education and Outreach, had come across *Touch the Stars* in a bookstore and was inspired to make the amazing Hubble images accessible for the ten million blind and visually impaired people in this country. He got a $10,000 grant from NASA, and Grice began creating *Touch the Universe*.

To make sure the images for the new book would work, Grice enlisted the help of teacher Benning Wentworth III and his ten astronomy students at the Colorado School for the Deaf and Blind in Colorado Springs. The students suggested, for example, that some of the raised pictures had

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too much detail for their fingers to interpret. One of the images, called the Hubble Deep Field North, is a collection of tiny swirls and blobs that depict galaxies billions of light-years distant. In her initial attempt, Grice had carefully rendered nearly every swirl and blob; on the students' advice, she eliminated many of the fainter galaxies, making the final embossed photograph much easier to comprehend.

"We see with our mind's eye, not only with our eyes," says Wentworth. "With this book, our students have something that can help form the image in the mind." One girl, for example, told Wentworth that the tactile picture of the Eskimo Nebula, so named because it looks like a head surrounded by the fur-edged hood of a parka, felt like a crispy fried egg.

But is there really any point in trying to convey a sense of astronomical objects to people who will never gaze at the brilliance of the night sky or peer through a telescope at a spiral galaxy? You might ask Kent Cullers, age 54, a radio astronomer with the SETI Institute (Search for Extraterrestrial Intelligence) in Mountain View, California, and the world's only totally blind astronomer. (He was the inspiration for the blind astronomer in the movie *Contact*.) In his forward to *Touch the Stars II*, Cullers wrote, "I can calculate the temperature of a star, but, before reading this book, I knew nothing about the appearance of the constellations."

Not surprisingly, Cullers is a big fan of Grice. "She was good at imagining the difficulties that a blind person might have, without, as typically happens with sighted people, becoming overwhelmed," he says. "She had enough empathy to get it, but not so much that she couldn't deal with it."

Maybe that's because her empathy is fortified with optimism. Grice got an e-mail recently from a woman who wanted to order *Touch the Universe* for her blind 10-year-old son. Despite all odds, wrote the mother, her son aspires to become an astronaut.

Says Grice, her earnest face alight: "Why not?"

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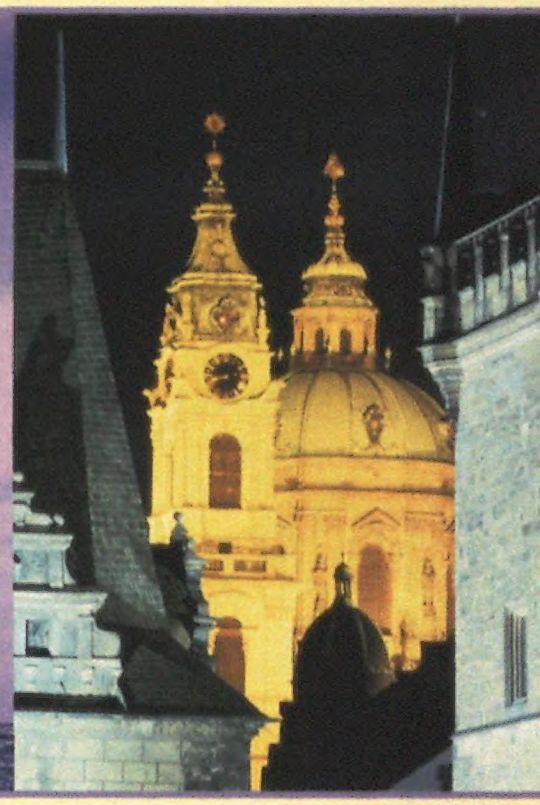

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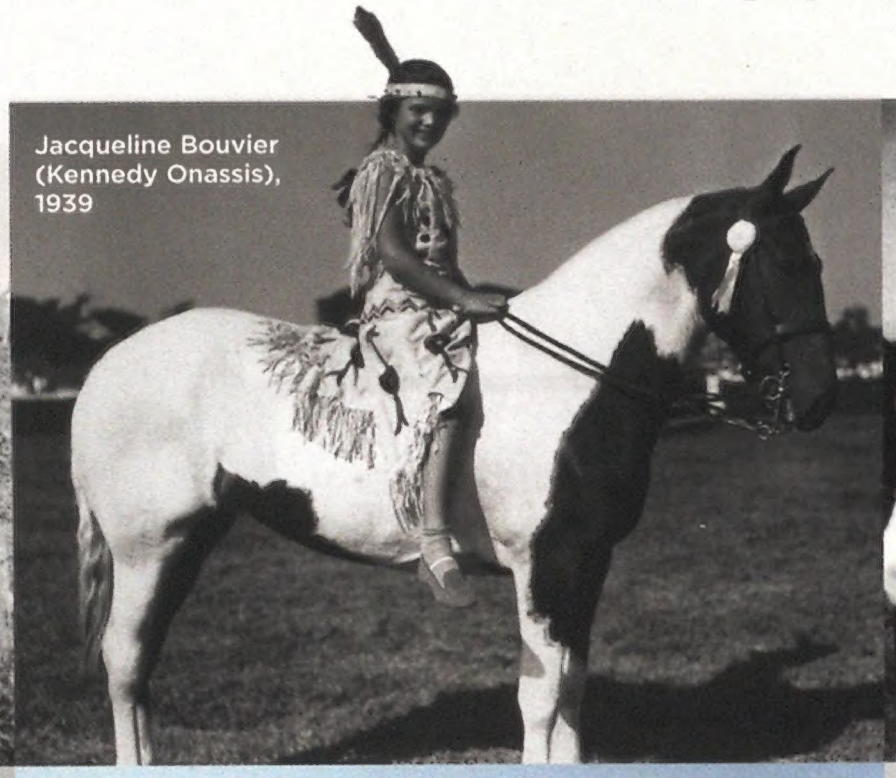
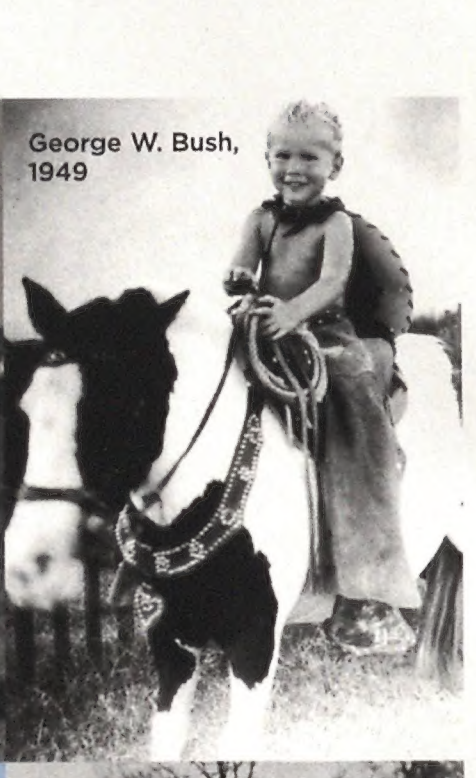
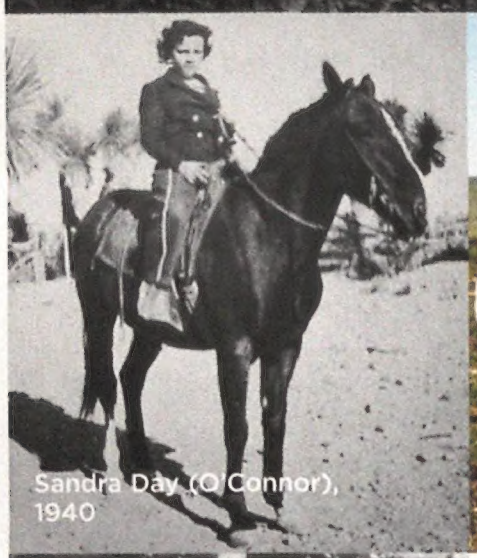
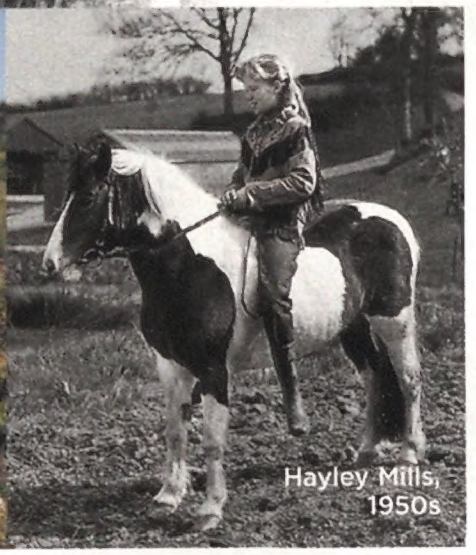
Jimmy Carter, 1920s


Jacqueline Bouvier (Kennedy Onassis), 1939


George W. Bush, 1949


Sandra Day (O'Connor), 1940

Diana Spencer, 1974 (Princess of Wales)


Hayley Mills, 1950s

Marlon Brando and his sister, 1930

Peter Fonda, 1940s

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